



iLook™ Ultrasound Tool **Service Manual**



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CHAPTER 1 Introduction

Before servicing the SonoSite ultrasound system, please read the information in this manual. This manual applies to the *iLook*® personal imaging tool and accessories.

1.1 About the System

The *iLook* system is a portable, software-controlled, ultrasound system with all-digital architecture. It is used to acquire and display real-time, 2D, color power Doppler (CPD), directional color power Doppler (DCPD), and Tissue Harmonic Imaging ultrasound images. The system includes cine review, a distance measurement, image storage, and image review. Currently, the system supports the C15/4-2 MHz 15-mm microcurved array broadband transducer and an L25/10-5 MHz 25-mm linear transducer.

The system accessories include an extra battery, an auxiliary power cable, a stand, and a docking station for charging batteries and downloading images to a personal computer using SiteLink image manager software.

Optional peripherals include a medical grade black and white printer and a Kensington Security Cable. Manufacturer's instructions accompany each peripheral. Instructions for the use of peripherals with the system are covered in the *iLook User Guide*.

The software that runs the system uses graphic display elements similar to those used in many personal computers. System terms and on-screen symbols are explained in the *iLook User Guide*.

The following figure illustrates the *iLook* system.

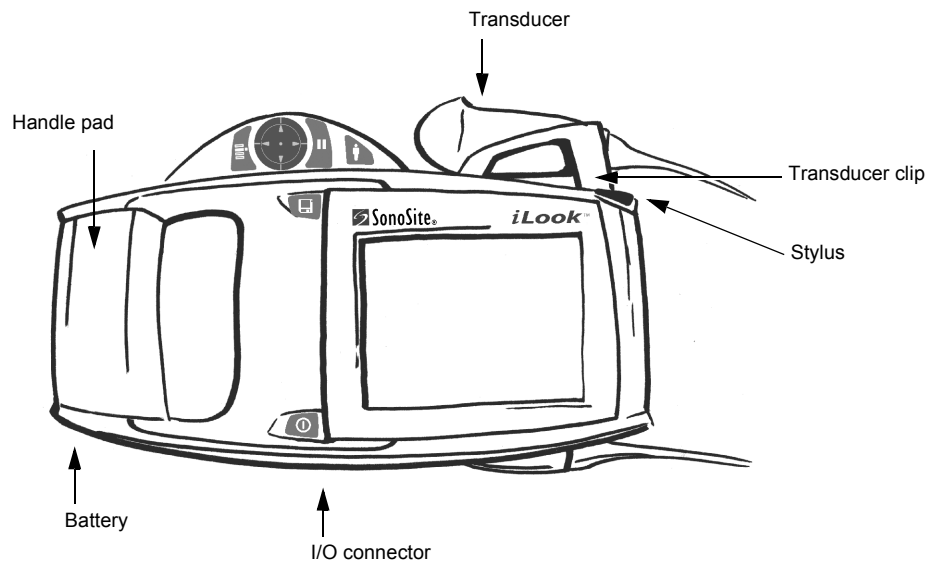


Figure 1.1 The *iLook* System

Table 1.1 The *iLook* System

Item	Description
Battery	Two batteries are provided. Fully depleted batteries require approximately two hours to charge to 90% capacity and three hours to charge to 100% capacity.
Handle Pad	Small and large handle pads are provided.
Transducer Clip (C15 only)	Provides a storage area for the C15 transducer during exams or when transporting the system.
Transducer	The transducer is permanently attached to the system.
Stylus	Used to tap on-screen menus, caliper placement, and data entry.
I/O Connector	Used to connect system to docking station and auxiliary power.

1.2 Audience

The intended audience of this manual is properly trained field and depot service personnel.

1.3 Conventions Used in This Manual

These conventions are used in this user guide:

- A **Warning** describes precautions necessary to prevent injury or loss of life.
- A **Caution** describes precautions necessary to protect the products.
- Operating instructions are introduced with a statement in **bold-face** type that ends with a colon. For example: **To read this user guide:**
- When the steps in the operating instructions must be performed in a specific order, the steps are numbered.
- Bulleted lists present information in list format, but they do not imply a sequence.
- The left side of the system is to your left as you face the system. The system handle is on the left side of the system, and the battery compartment is at the bottom left of the system.
- *Note: A note cites information that is a general rule for a procedure, gives an exception to a rule, or provides noncritical information of general interest.*

1.4 About the System Software

Your SonoSite system contains software that controls its operation. From time to time, SonoSite may provide new software for use with your system. This software is provided using a method proprietary to SonoSite. This software may be either required or optional.

When the new software is required, you must have it installed if you wish to use the new software features. If you choose not to have it installed, please notify SonoSite Technical Support at 877-657-8118.

When the software is optional, you can either have it installed or choose to use your existing software.

1.5 Software Licensing

Use of software that you receive from SonoSite is controlled by a license key. A license key is a number sequence containing exactly 12 decimal digits. If you require a license key you will be notified by SonoSite.

License keys are obtained only from SonoSite or from its authorized representatives. See [Section 4.4, System License Keys, on page 22](#) for information on obtaining a license key.

CHAPTER 2 Safety

Please read this information before using the *iLook* system. It applies to the ultrasound system, transducers, accessories, and peripherals.

A **Warning** describes precautions necessary to prevent injury or loss of life.

A **Caution** describes precautions necessary to protect the products.

2.1 Electrical Safety

This system meets EN60601-1, Class I/internally-powered equipment requirements and Type BF isolated patient-applied parts safety requirements.

This system complies with the applicable medical equipment requirements published in the Canadian Standards Association (CSA), European Norm Harmonized Standard, and Underwriters Laboratories (UL) safety standards. See [Section 3.5, *System Specifications*, on page 15](#).

For maximum safety observe the following warnings and cautions:

- Warning:**
- To avoid the risk of electrical shock or injury, do not open the system enclosures. All internal adjustments and replacements, except battery replacement, must be made by a qualified technician.
 - To avoid the risk of injury, do not operate the system in the presence of flammable gasses or anesthetics. Explosion can result.
 - To avoid the risk of electrical shock, use only properly grounded equipment. Shock hazards exist if the AC power supply is not properly grounded. Grounding reliability can only be achieved when equipment is connected to a receptacle marked “Hospital Only” or “Hospital Grade” or the equivalent. The grounding wire must not be removed or defeated.

Warning:	To avoid the risk of electrical shock, before using the transducer, inspect the transducer face, housing, and cable. Do not use the transducer if the transducer or cable is damaged. To avoid the risk of electrical shock, always disconnect the AC power supply from the system before cleaning the system. To avoid the risk of electrical shock, do not use any transducer that has been immersed beyond the specified cleaning or disinfection level. See Chapter 5, <i>Cleaning and Disinfecting</i>, on page 27. To avoid the risk of electrical shock and fire hazard, inspect the power supply, AC power supply cord and plug on a regular basis. Ensure they are not damaged. To avoid the risk of electrical shock, use only accessories and peripherals recommended by SonoSite. Connection of accessories and peripherals not recommended by SonoSite could result in electrical shock. Contact SonoSite or your local representative for a list of accessories and peripherals available from or recommended by SonoSite. To avoid the risk of electrical shock, use commercial grade peripherals recommended by SonoSite on battery power only. Do not connect these products to AC power when using the system to scan or diagnose a patient/subject. Contact SonoSite or your local representative for a list of the commercial grade peripherals available from or recommended by SonoSite. To avoid the risk of electrical shock to the patient/subject, do not touch the system battery contacts while simultaneously touching a patient/subject. To prevent injury to the operator/bystander, the transducer must be removed from patient contact before the application of a high-voltage defibrillation pulse.
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2.2 Equipment Protection

To protect your ultrasound system, transducer, and accessories, follow these precautions.

Caution:	Excessive bending or twisting of cables can cause a failure or intermittent operation. Improper cleaning or disinfecting of any part of the system can cause permanent damage. For cleaning and disinfecting instructions, see Chapter 5, <i>Cleaning and Disinfecting</i>, on page 27. Do not use solvents such as thinner or benzene, or abrasive cleaners on any part of the system.
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Caution:	Remove the battery from the system if the system is not likely to be used for some time. Do not spill liquid on the system. The top membrane of a phantom is delicate and can be damaged if handled improperly. Use minimum force when coupling the transducer to a phantom. Do not handle PCBs without proper static protection. Improper handling may damage components. Incorrect assembly or configuration or using an improper power source may damage the system.
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2.3 Battery Safety

To avoid the risk of injury, follow the warnings and cautions to make sure that the battery does not burst, ignite, or generate heat or fumes.

Warning:	The battery has a safety device. Do not disassemble or alter the battery. Charge the batteries only when the ambient temperature is between 0° and 40°C (32° and 104°F). Do not short-circuit the battery by directly connecting the positive and negative terminals with metal objects. Do not heat the battery or discard it in a fire. Do not expose the battery to temperatures over 60°C (140°F). Keep it away from fire and other heat sources. Do not charge the battery near a heat source, such as a fire or heater. Do not leave the battery in direct sunlight. Recharge the battery only with the docking station battery charger or the system. Do not pierce the battery with a sharp object, hit it, or step on it. Do not use a damaged battery. Do not solder a battery. When connecting the battery to the battery charger or to the system, never reverse the polarity of the battery terminals. The polarity of the battery terminals are fixed and cannot be switched or reversed. Do not force the battery into the system or the battery charger. Do not connect the battery to an electrical power outlet. Do not continue recharging the battery if it does not recharge after two successive six hour charging cycles.
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Caution:	To avoid the battery bursting, igniting, or fumes from the battery and causing equipment damage, observe the following precautions: Do not immerse the battery in water or allow it to get wet. Do not put the battery into a microwave oven or pressurized container. If the battery leaks or emits an odor, remove it from all possible flammable sources. If the battery emits an odor or heat, is deformed or discolored, or in any way appears abnormal during use, recharging or storage, immediately remove it and stop using it. If you have any questions about the battery, consult SonoSite or your local representative. Store the battery between -20°C (-4°F) and 60°C (140°F). Use only SonoSite batteries.
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2.4 Biological Safety

Observe the following precautions related to biological safety.

Warning:	Non-medical (commercial) grade peripheral monitors have not been verified or validated by SonoSite as being suitable for diagnosis. Do not use the system if it exhibits erratic or inconsistent behavior. Discontinuities in the scanning sequence are indicative of a hardware failure that must be corrected before use. Do not use the system if it exhibits artifacts on the LCD screen, either within the clinical image or in the area outside of the clinical image. Artifacts are indicative of hardware and/or software errors that must be corrected before use. Some transducer covers contain natural rubber latex and talc, which can cause allergic reactions in some individuals. Refer to the FDA Medical Alert, March 29, 1991. Perform ultrasound procedures prudently. Use the ALARA (as low as reasonably achievable) principle. SonoSite does not currently recommend a specific brand of acoustic standoff.
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2.5 Labeling Symbols

Labeling symbols for SonoSite products can be found in the user guide for each product.

CHAPTER 3 System Overview

3.1 Theory of Operation

The SonoSite ultrasound system has seven major functional groups: the transducer, the acquisition subsystem, the processing subsystem, the display subsystem, the control subsystem, the user interface subsystem, and the power subsystem.

Figure 3.1 shows how these functions interact.

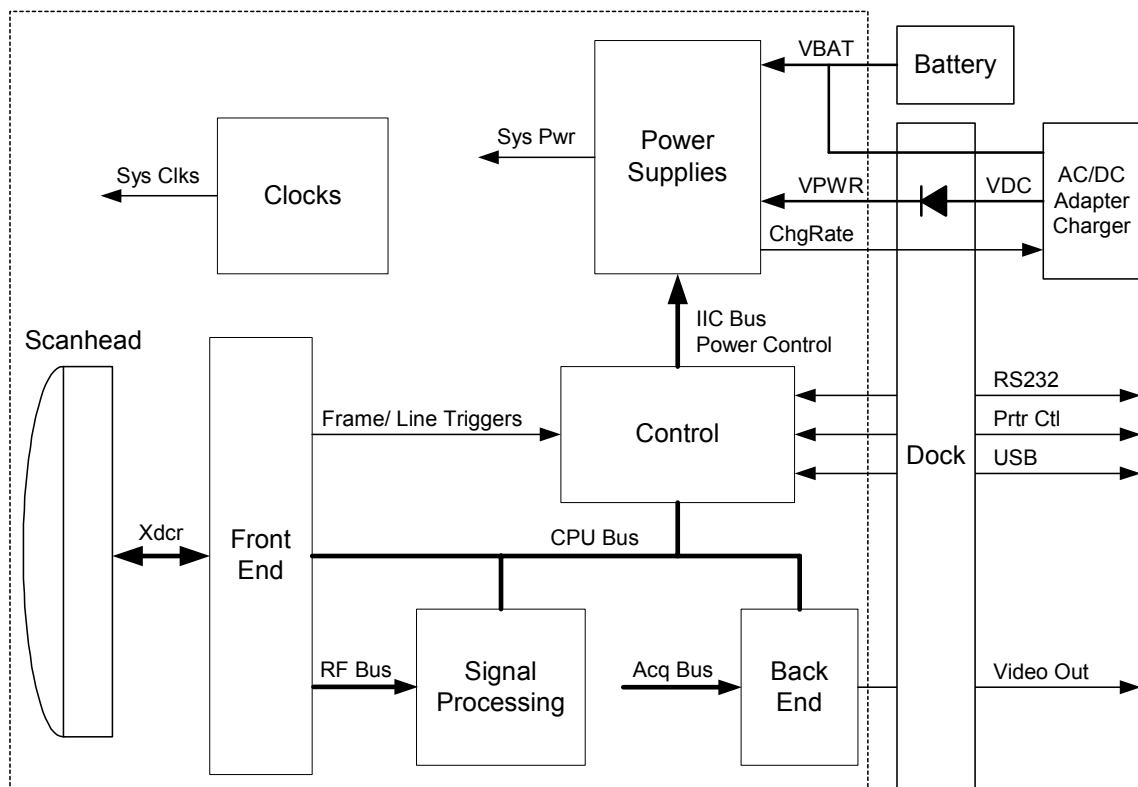


Figure 3.1 iLook Block Diagram

3.1.1 Transducer

The transducer elements convert the pulser voltage to acoustic energy during the “transmit” portion of the ultrasound acquisition cycle. Also, the transducer elements convert the acoustic echo to voltage in the “receive” portion of the acquisition cycle. The system transducers have 64–128 elements. The acquisition subsystem senses the voltage developed on the transducer elements.

3.1.2 Acquisition Subsystem

The acquisition subsystem consists of a beamformer and an interface to the transducer. The beamformer times the “transmit” pulses to focus the acoustic beam. Also, the beamformer amplifies the low-level echo signal and times and focuses the “receive” information.

3.1.3 Processing Subsystem

The high-speed processing subsystem interfaces with the beamformer. The processing subsystem demodulates, filters, detects, and compresses the signal supplied by the beamformer. Next, it sends this data to the display subsystem.

3.1.4 Display Subsystem

The display subsystem converts the detected ultrasound data into picture elements (pixels). The software user interface graphics are combined with the ultrasound information and converted to a video stream. The external video ports support NTSC and PAL format.

3.1.5 Control Subsystem

The control subsystem consists of the central processing unit, program and video memory, permanent image storage and retrieval memory, and a connection to the user interface keys. The control software includes the acoustic power and intensity software power group monitors, and a beamformer monitor. This software makes the system operate within acoustic power and intensity limits, which guarantees a level of patient safety.

3.1.6 User Interface Subsystem

The user interface subsystem comprises the software user interface and the form factor. The software user interface is the interaction between the user and the screen layout components. The form factor is the device’s physical attributes: buttons, location and grouping of buttons and the device size, shape, and weight. Dedicated controls, or often-used features, are grouped according to user workflow.

3.1.7 Power Subsystem

The power subsystem provides power and protects the hardware from destructive or unsafe conditions. This subsystem’s hardware and software monitors detect failures in the device. Upon detecting a fault, the system disables the pulser supply, and signals an error to the control subsystem. The power subsystem includes the battery pack and the battery charging electronics.

3.2 Components

The SonoSite system components are identified in [Section 1.1, About the System, on page 1](#).

3.3 Controls

[Figure 3.2](#) shows the system controls.

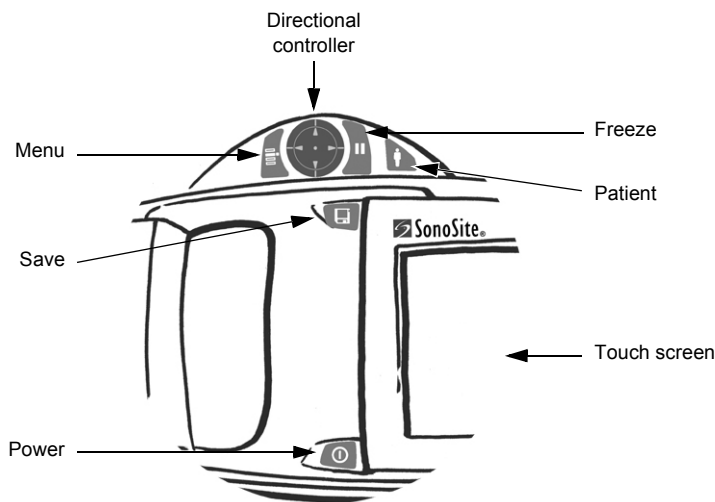


Figure 3.2 System Controls

Table 3.1 System Controls

System Control	Icon	Description
Power		Press and hold for 1 beep to turn power on. Press and hold for 2 beeps to turn power off.
Menu		Press to turn the on-screen menu on. Press again to turn the on-screen menu off.
Freeze		Press to freeze an image. Measurements can be made on a frozen image. Press freeze again to unfreeze the image.

Table 3.1 System Controls

System Control	Icon	Description
Save		Press to save an image to the internal memory. Storage capacity is up to 74 images.
Patient		Press to access Patient Information, Exam Type, Image Review, and System Set-up. Press again to return to imaging.
Directional Controller		Use to navigate on-screen menus, adjust caliper position, and enter data. Use the right, left, up, or down arrows to highlight menu items. Press the center to select.
Touch Screen		Use stylus to tap on-screen menu options, position calipers, and enter data. The touch screen is not active during live imaging.

3.4 Accessories

For information about accessories and other SonoSite products, refer to the user guide for each product.

3.4.1 Battery Pack

Caution: Use only the specified SonoSite battery pack. For battery safety notes, see [Section 2.3, Battery Safety, on page 7](#).

The system can be powered from either a battery pack or external power.

The system is powered by a rechargeable, 3-cell, 11.4 VDC, lithium-ion battery. A fully charged battery will last for 20 minutes or more, depending on usage. The battery pack case is made of injection molded plastic. When in use, it is inserted into the system. The battery pack has no user-serviceable parts. The operating life of the battery is 1-2 years, depending on how you use the system. [Table 3.2](#) contains battery operating specifications.

Table 3.2 Battery Pack Operation Specifications

Battery Pack Operation Parameter	Specification
Operation time based on usage model: In a 2-hour period, the projected conservative power usage model for the imaging physical use is as follows: • Time spent actively scanning (full power) = 20% • Time device is in “Freeze” = 5% • Time device is “Off” = 20% • Time device is in Docking Station charging = 55% In a 1-hour period, the projected conservative power usage model for the PICC line use is as follows: • Time spent actively scanning (full power) = 33% • Time device is “Off” = 67%	20 min @ 25°C
Operation time during power off (leakage and self discharge)	10 days @ 25°C
Number of charge discharge cycles (100% depth of discharge)	500 @ 25°C

3.4.1.1 Battery Charge Indicators

The battery charge indicators, which consist of light-emitting diodes (LEDs) on the docking station, indicate the current battery level.

- The green LED lit means the system battery is fully charged.
- The yellow LED lit means the system battery is partially charged.

[Table 3.3](#) contains the charging requirements for the system.

Table 3.3 System Charging Requirements

System Charging Parameter	Specification
Charge time to 100% capacity (internal charger) – power turned off on user interface	3 hours @ 77°F (25°C)

3.4.2 External Power

The external power connection provides the system power via the power adapter. External power charges the battery pack and powers the system in low battery conditions.

3.4.2.1 External System Connections

Figure 3.3 shows the following external system connections:

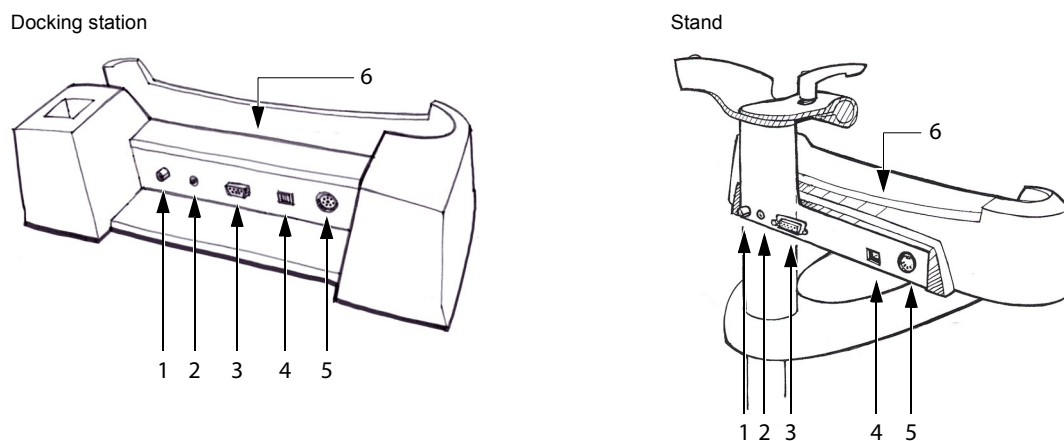


Figure 3.3 Connectors

Table 3.4 Docking Station and Stand Connectors

Number	Icon	Feature
1		Video out connector
2		Print control connector (not active)
3		RS-232 connector
4		USB connector (not active)
5		DC input connector
6		I/O connector

3.4.3 Power Adapter

Caution: Use only the specified SonoSite power adapter.

A universal power adapter (50–60 Hz, 85–264 VAC) powers the SonoSite system. When the system is placed in the docking station, which is plugged into a wall outlet, the battery pack recharges. Recharging a battery which is not fully discharged will not decrease battery life. The ambient temperature must be between 32° and 104°F (0° and 40°C) to charge a battery successfully. To maintain battery charge, place the system in the docking station when it is not in use.

3.5 System Specifications

This section provides specifications for the SonoSite ultrasound system.

3.5.1 Physical Dimensions

Length: 6.4 in. (16.26 cm)

Width: 10.85 in. (27.56 cm)

Depth: 1.5 in. (3.81 cm)

Weight: 2.8 lbs. (1.27 kg) with the C15 transducer and battery installed

Weight: 2.8 lbs. (1.27 kg) with the L25 transducer and battery installed

3.5.2 Monitor

Height: 3.25 in. (8.26 cm)

Width: 4.25 in. (10.8 cm)

Diagonal: 5.25 in. (13.34 cm)

3.5.3 Transducers

C15/4-2 MHz 15 mm

L25/10-5 MHz 25 mm

3.5.4 Imaging Modes

2D (256 gray shades)

Color power Doppler (CPD) (64 colors)

Directional color power Doppler (DCPD) (64 colors)

Tissue Harmonic Imaging

3.5.5 Image Storage

Up to 74 images (depending on exam type and imaging mode)

Cine review

3.5.6 Temperature, Pressure, and Humidity Limits

3.5.6.1 Operating Limits: System/Docking Station

- 10–40°C (50–104°F), 15–95% R.H.
- to 700hPa (0.7 ATM)

3.5.6.2 Shipping/Storage Limits: System/Docking Station without Battery

- -35–65°C (-31–149°F), 15–95% R.H.
- to 500hPa (0.5ATM)

3.5.6.3 Operating Limits: Battery

- 10–40°C (50–104°F), 15–95% R.H.
- to 700hPa (0.7 ATM)

3.5.6.4 Shipping/Storage Limits: Battery

- -20–60°C (-4–140°F), 15–95% R.H.*

* For storage longer than 30 days, store at or below room temperature.

- to 500hPa (0.5ATM)

3.5.7 Electrical

Power Supply Input: 100-120/220-240 VAC, 50/60 Hz, 1.2 A Max @ 100 VAC.

Power Supply Output: (1) 15 VDC, 2 A Max (system; battery charging, spare)
(2) 12.6 VDC, 0.8 A Max (battery charging, system)

Docking Station Output: (1) 15 VDC, 2 A Max (system; battery charging, spare)
(2) 12.6 VDC, 0.8 A Max (battery charging, system)

Stand Output: (1) 15 VDC, 2 A Max (system; battery charging)
(2) 12.6 VDC, 0.8 A Max (battery charging, system)

3.6 Battery

- 3-cell, 11.4 VDC, 0.8 amp-hours, rechargeable lithium ion battery pack
- Run time is 20 minutes or more, depending on usage and display brightness.

3.7 Safety Requirements

3.7.1 Electromechanical Safety Standards

EN 60601-1:1997, European Norm, Medical Electrical Equipment–Part 1. General Requirements for Safety.

EN 60601-1-1:1993, European Norm, Medical Electrical Equipment–Part 1. General Requirements for Safety–Section 1-1. Collateral Standard. Safety Requirements for Medical Electrical Systems.

EN 60601-1-2:2001, European Norm, Medical Electrical Equipment. General Requirements for Safety-Collateral Standard. Electromagnetic Compatibility. Requirements and Tests.

C22.2, No. 601.1:1990, Canadian Standards Association, Medical Electrical Equipment–Part 1. General Requirements for Safety.

CEI/IEC 61157:1992, International Electrotechnical Commission, Requirements for the Declaration of the Acoustic Output of Medical Diagnostic Ultrasonic Equipment.

UL 2601-1:1997, Second Edition, Underwriters Laboratories, Medical Electrical Equipment-Part 1: General Requirements for Safety.

3.7.2 EMC/EMI Standards

CISPR11:97, International Electrotechnical Commission, International Special Committee on Radio Interference. Industrial, Scientific, and Medical (ISM) Radio-Frequency Equipment Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement.

The Classification for the Sonosite system, SiteStand, accessories, and peripherals when configured together is: Group 1, Class A.

3.7.3 Airborne Equipment Standards

RTCA/DO160D:1997, Radio Technical Commission for Aeronautics, Environmental Conditions and Test Procedures for Airborne Equipment, Section 21.0 Emission of Radio Frequency Energy, Category B.

CHAPTER 4 Setup and Operation

Warning: **CRITICAL TEST FUNCTION** — Skipping the functional tests in this procedure could adversely affect safety or effectiveness of the system.

Operation of the SonoSite ultrasound system can be found in the user guide provided with each system.

4.1 Turning the System On and Off

When turning power on or off, you must push and hold the **Power** switch for approximately one second before the system responds. This feature prevents battery discharge, resulting from accidentally turning the system on. It also prevents accidentally turning the system off during an exam.

The first time you turn on the system, set the date and time. See the *iLook User Guide*.

Caution: Do not use the system if an error message appears on the image display. Note the error code. Call SonoSite or your local representative. When an error code occurs, turn off the system by removing the battery.

To turn on power:

- 1 Locate the **Power** switch on the front of the system to the left of the display. See [Figure 3.2, System Controls on page 11](#).
- 2 Press and hold the **Power** switch until the system beeps or until you see the image display.

- 3 Release the **Power** switch.

To turn off power:

- Press and hold for 2 beeps to turn power off.

4.2 Installing and Removing the Battery

The battery comprises three lithium-ion cells plus electronics, a temperature sensor, and the battery contacts. When in use, it is inserted into the system.

Warning: If you are holding the system when you remove the battery place your hand beneath the battery. If it falls to the floor it could be damaged or cause personal injury.

If the battery is being installed for the first time it will need to be charged. Make sure to remove the protective tape from the battery contacts before charging the battery.

To install the battery:

- 1 Insert the battery (ridge side up) into the battery compartment. See [Figure 4.1](#).
- 2 Slide the latch up to secure the battery in place.

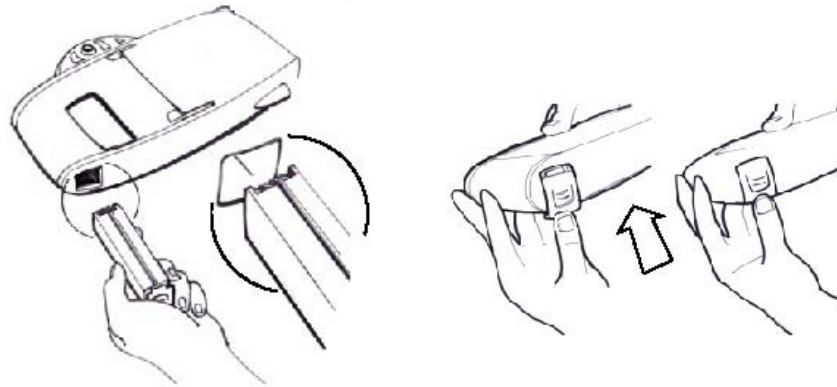


Figure 4.1 Battery Installation

To remove the battery:

- 1 Turn the system off.
- 2 Place your hand underneath the battery. Slide the battery latch down and pull the battery out of the compartment.

Warning: To avoid damage to the battery or personal injury, place your hand under the battery compartment to prevent the battery from falling out.

Note: When the battery charge is depleted or the battery is replaced, the system retains brightness, contrast, auto shut off, language, video format, date/time, and patient information.

4.3 Using AC Power

The battery charges when the system is using AC power. If the system is off and connected to AC power, a fully discharged battery will charge in about three hours.

To operate the system using AC power:

- 1 Connect the line cord to the AC power adapter.
- 2 Connect the line cord to a hospital-grade electrical outlet.
- 3 Connect the auxiliary power cable, P02803, to the power supply.
- 4 Connect the auxiliary power cable to the system.

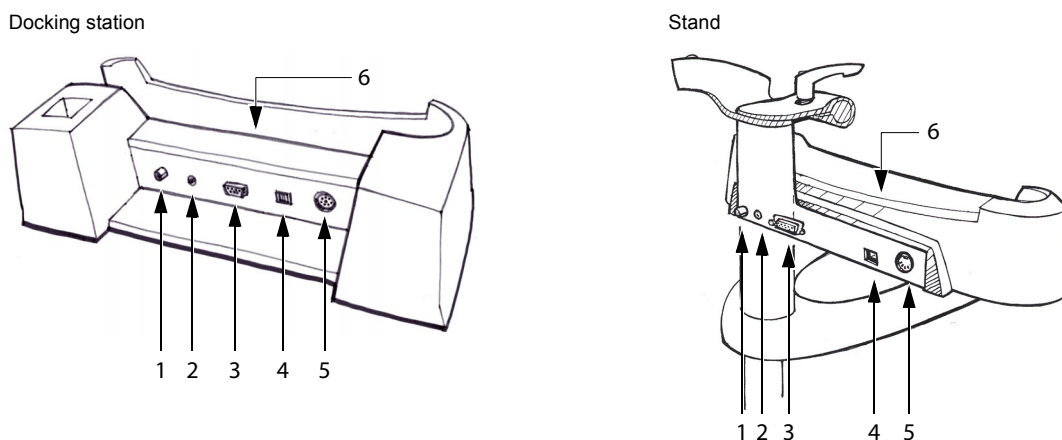


Figure 4.2 Connectors

Table 4.1 Docking Station and Stand Connectors

Number	Icon	Feature
1		Video out connector
2		Print control connector (not active)
3		RS-232 connector
4		USB connector (not active)
5		DC input connector
6		I/O connector

4.4 System License Keys

Software functions in SonoSite products is controlled through the use of license keys.

To view your license key:

- 1 Press the **Patient** key.
- 2 Select or tap **System Set-up...** from the on-screen menu.
- 3 Select or tap **Next Page** from the on-screen menu.
- 4 Select or tap **System Info...** from the on-screen menu.
The license key is the 12 digit code at the top of the screen next to System Information. See [Figure 4.3](#).
- 5 Select or tap **Cancel** to exit the keyboard and return to the previous menu.

Should the use of your system depend on installing a license key, you will be notified by a SonoSite representative. They will provide instructions detailing the installation. If you have questions about license keys you can view the technical support website at www.sonosite.com selecting Products then Technical Support, or by calling SonoSite Technical Support at 1-877-657-8118.

If you encounter difficulty with the system, use the information in this chapter to help correct the problem. If the problem is not covered here, call SonoSite Technical Support at the following numbers or addresses:

USA/Canada Customers

- Technical Support: **1-877-657-8118**
- Technical Support fax and email: **1-425-951-6700; service@sonosite.com**
- SonoSite website: www.sonosite.com

International Customers

- Call your local representative or **1-425-951-1330**



Figure 4.3 System Information Screen

4.4.1 Displaying the System Information Screen

To display the system information screen, see [To view your license key: on page 22](#).

4.4.2 Displaying the License Update Screen

To display the license update screen:

- 1 On the system information screen, select **License**.
The license update screen displays.
- 2 Perform the steps in [Installing a License Key on page 23](#).

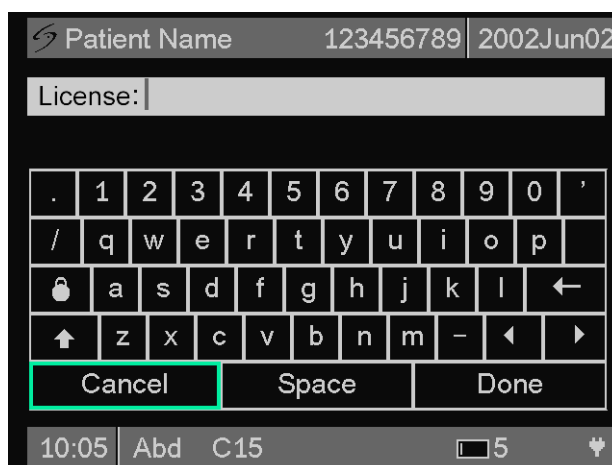


Figure 4.4 License Update Screen

4.4.3 Installing a License Key

- 1 On the system information screen, select **License** by scrolling to the left and pressing the control button, or using the stylus to select **License**.
- 2 Using the stylus, install the license key provided by Technical Support.

4.5 Checking and Charging the Battery

To check the battery:

Note: Disconnect the system from AC power before checking the battery charge.

LEDs (light-emitting diodes) on the lower section of the system docking station (see [Figure 4.5](#)) allow you to check the battery condition. See [Table 4.2](#) for the meaning of LED indicators.

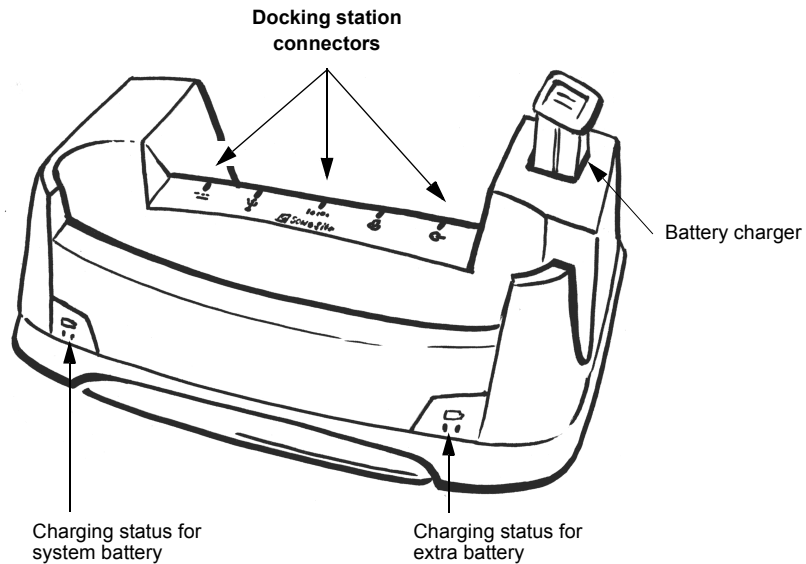


Figure 4.5 Docking Station

Table 4.2 Charge Status LED State Assignments

Configuration			System Battery LEDs		Spare Battery LEDs	
System	System Battery	Spare Battery	Charge	Ready	Charge	Ready
Out of Docking Station	x	Out	Off	Off	Off	Off
Out of Docking Station	x	Charging	Off	Off	On	Off
Out of Docking Station	x	Ready	Off	Off	Off	On
In Docking Station	Charging	Out	On	Off	Off	Off
In Docking Station	Charging	Charging	On	Off	On	Off
In Docking Station	Charging	Ready	On	Off	Off	On
In Docking Station	Ready	Out	Off	On	Off	Off
In Docking Station	Ready	Charging	Off	On	On	Off
In Docking Station	Ready	Ready	Off	On	Off	On

The system will operate on a fully-charged battery for 20 minutes or more, depending upon use. Ensure the battery is charged at all times to provide the longest possible battery operation.

When the system is not likely to be used for some time, remove the battery from the system to prevent total battery discharge.

To charge the battery:

Caution: Charge batteries only when the ambient temperature is between 32° and 104°F (0° and 40°C).

- 1** Connect the AC line cord of the AC power adapter to a hospital-grade electrical outlet.
- 2** Connect the DC line cord of the AC power adapter to the power connector on the docking station. ([Figure 4.2](#) and [Table 4.1](#))
- 3** Charge the battery until it is fully charged.
Note: It takes about three hours to charge a battery when the system is off.
- 4** Disconnect the system from AC power.
- 5** Turn the system on to check the battery charge.

CHAPTER **5** **Cleaning and Disinfecting**

5.1 Universal Precautions

SonoSite recommends that personnel who have regular exposure to medical devices returned for service practice “universal precautions.” Universal precautions are an approach to infection control. Those servicing this product should follow the prescribed standards for their area.

5.2 Receipt of Suspected Contaminated Materials

- If visual inspection suggests possible contamination when opening a product returned for service, take proper steps to contain the contamination. Wear necessary Personal Protective Equipment (PPE) (gloves, masks, and gowns) when opening or examining a suspect package.
- Before transfer to a service area, label the suspect package “contaminated” and seal it to prevent exposure.
- Discard any packing materials removed from a package suspected of contamination in a biohazard container.
- Discard any contaminated materials received with the product in an appropriate biohazard container. Contaminated materials may include biohazardous waste and sharps.
- Maintain a disinfecting agent in case any work surface is contaminated. The recommended agent is 0.5% sodium hypochlorite (bleach) solution. To prepare the agent, mix one part household bleach (5.25% - 6% sodium hypochlorite) to nine parts water. Spray or wipe the solution onto the work surface and allow to air dry.

Please use these recommendations when cleaning or disinfecting your ultrasound system, transducers, and accessories. This chapter assists in effective cleaning and disinfection, but it is also intended to protect the system and transducers against damage during cleaning or disinfection.

For more information about cleaning or disinfecting solutions or ultrasound gels for the transducer, call SonoSite technical support or your local representative. For information about a specific product, call the product manufacturer.

5.3 Recommended Disinfectants

For a list of disinfectants recommended for use on the SonoSite ultrasound system and transducers, see the *iLook User Guide*.

CHAPTER 6 Troubleshooting

6.1 System and Subsystem Diagnosis

This section covers basic diagnostic and troubleshooting procedures you may need if the system does not operate properly. To diagnose system failures, consult [Table 6.1](#) and the referenced diagnostic figures that follow.

Table 6.1 Troubleshooting Subassemblies and Diagnostic Figures

Subassemblies	Diagnostic Figures
Display	Figure 6.2
External Display	Figure 6.3
Control Panel	Figure 6.4
System	Figure 6.5
Battery	Figure 6.6

6.2 System Repair

The system is repairable through subassembly replacement.

6.3 Test Equipment

There is no test equipment required for this troubleshooting section. Test aids include an external monitor and a spare battery.

6.4 Failures

6.4.1 Display

Attach an external monitor to the external video connector on the docking station to verify display failures. For example, if the system display is blank and the external monitor works properly, the system display requires servicing.

6.4.2 Control Panel

Go to the patient information screen and select each individual key on the keyboard to identify and verify control panel failures. Press function keys and note their response.

6.4.3 Main PCBA

The main PCBA can present symptoms that may be difficult to assess. Main PCBA failures result in “assert codes” that are output to the display. Note these assert codes and contact SonoSite technical support, per [Appendix B, Service Event Report, on page 87](#), to clarify the failure. [Figure 6.1](#) shows an assert code and a maintenance icon displayed on the system screen.

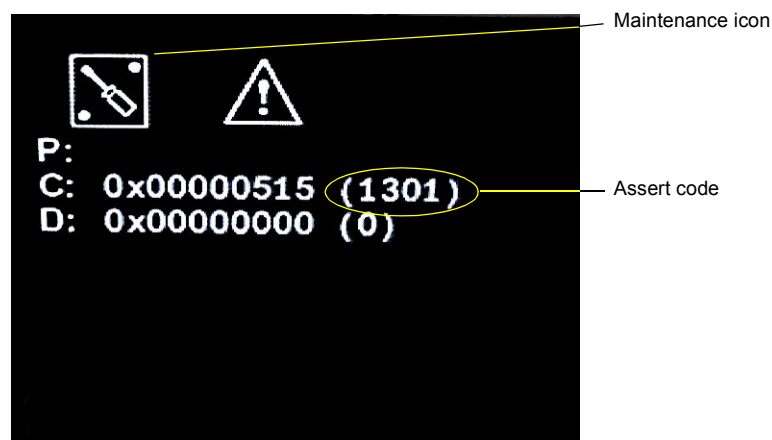


Figure 6.1 Assert Code and Maintenance Icon

6.4.4 Clearing the Main PCBA Failure

After the assert code has been recorded, power down the system.

- 1** Remove the system from the docking station or the stand.
- 2** Remove the battery.
- 3** After the system has powered down, reinstall the battery.
- 4** Turn the power back on to check if the fault cleared or if the condition remains. If the condition cleared, you may use the system. If the condition remains, corrective action must be taken before the system can be used.

6.4.5 Battery

If the system does not operate or does not run for the expected duration for a given charge, battery failure is likely.

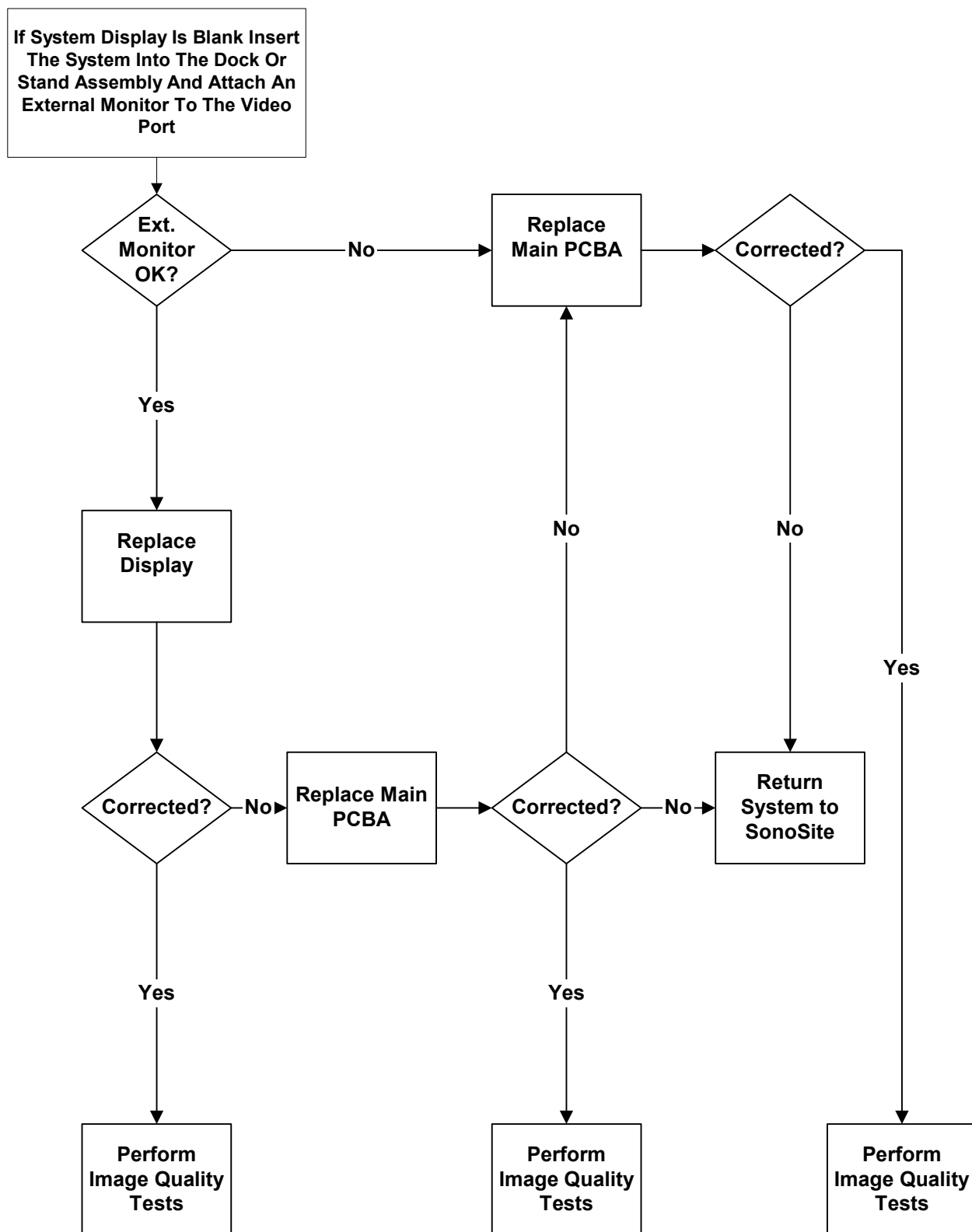


Figure 6.2 Display Diagnosis

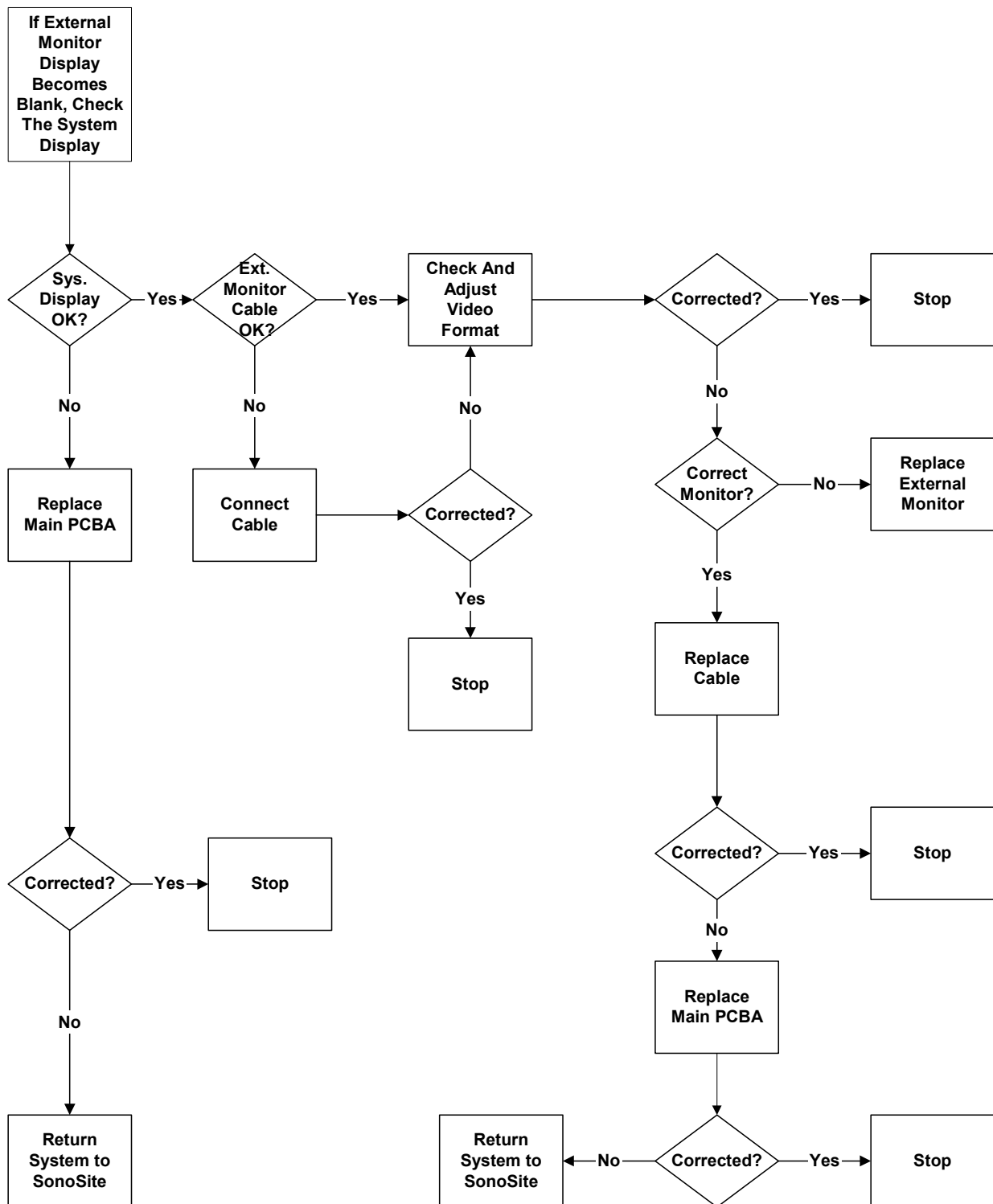


Figure 6.3 External Monitor Diagnosis

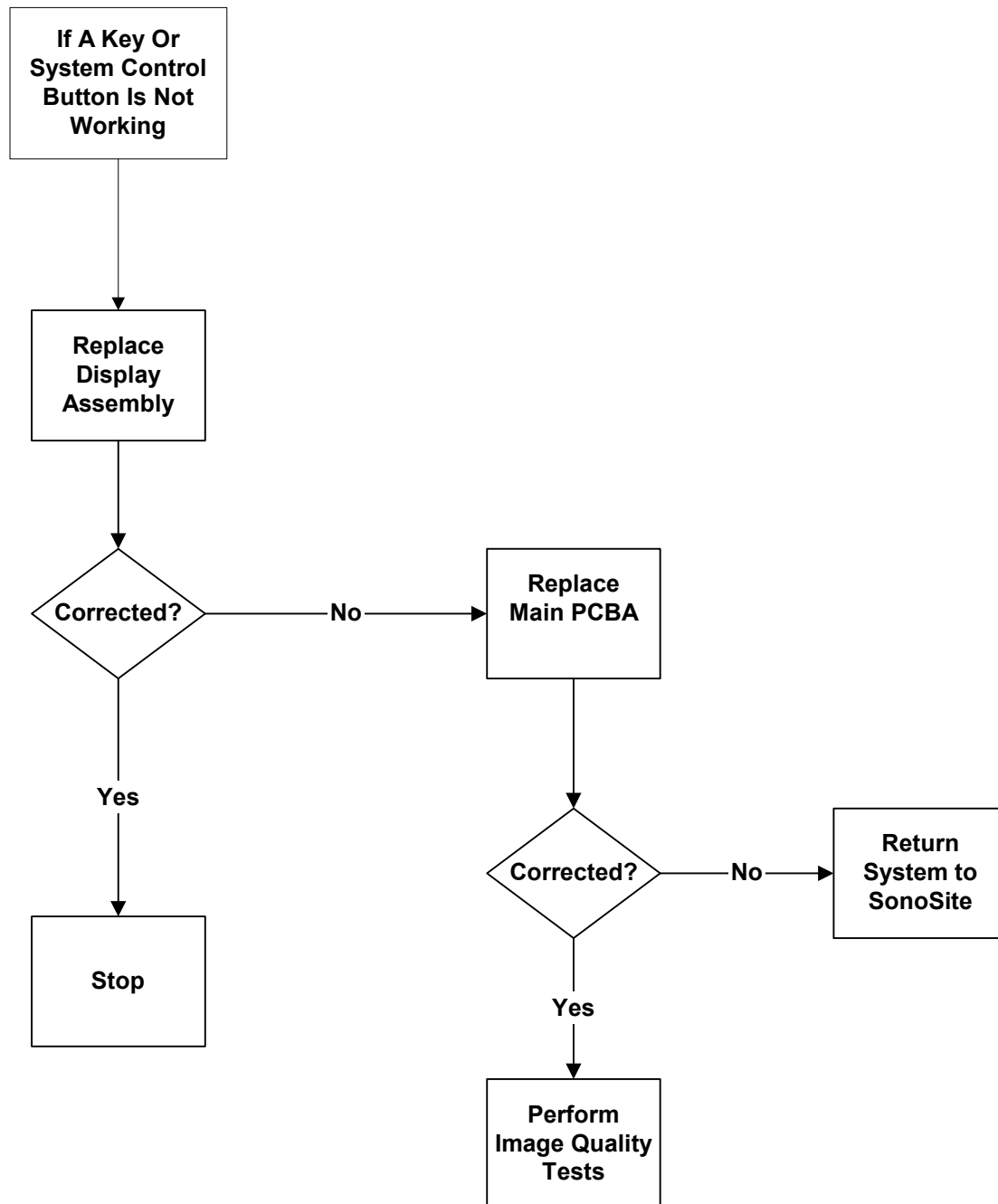


Figure 6.4 Control Panel Diagnosis

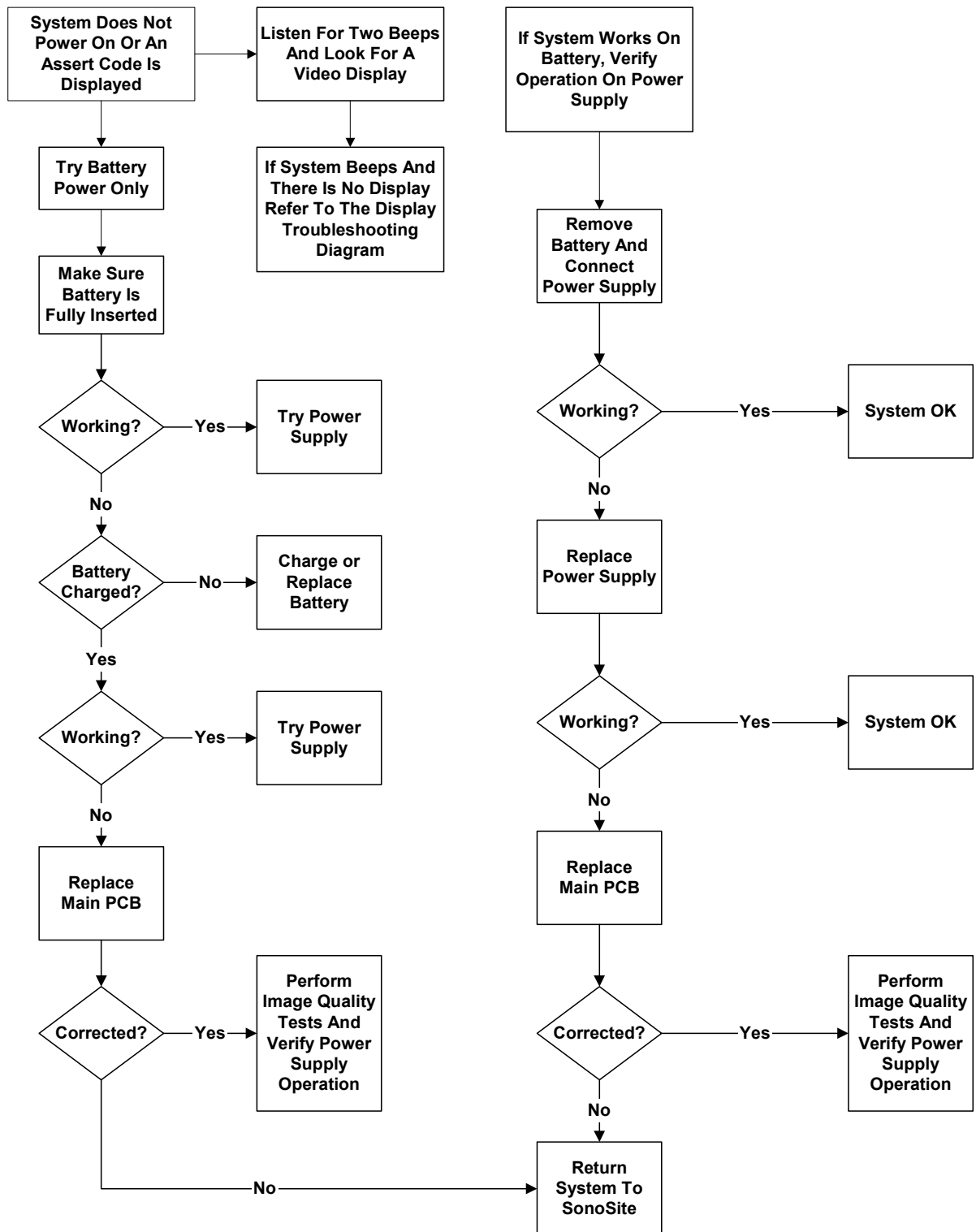


Figure 6.5 System Diagnosis

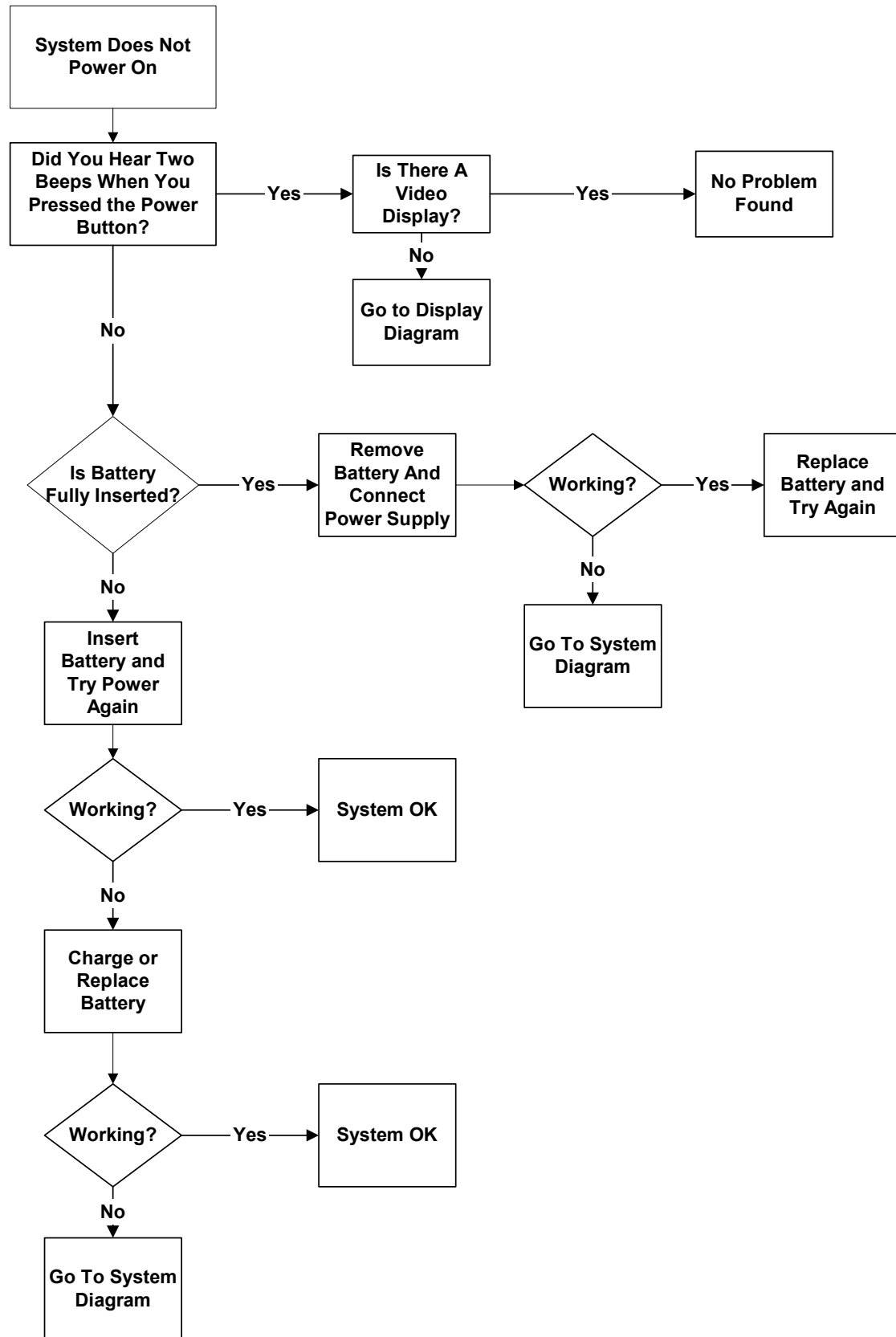


Figure 6.6 Battery Diagnosis

CHAPTER 7

Replacement Procedures

7.1 Display Subassembly Replacement

Note: Consult [Section 6, Troubleshooting, on page 29](#) before making any repairs.

7.1.1 Required Parts

Service Assembly, Display, *iLook* (P03038)

7.1.2 Required Tools and Materials

- A #1 Phillips screwdriver, 7.0 in. (17.8 cm / 177.8 mm)
- A 1/8" hex driver
- A 3/32" hex driver
- A 9/64" hex driver
- A torque driver, 2.0–10.0 in./lb. (0.23–1.1 newton meter)
- An anti-static mat
- A wrist grounding strap

Caution: Always use correct ESD procedures. ESD damage is cumulative and may not be noticeable at first. Initial ESD symptoms may be slightly degraded performance or image quality.

7.1.3 Removing the Display Subassembly

- 1 Remove the battery by following the procedure in [Section 4.2, *Installing and Removing the Battery*, on page 20](#).
- 2 Place the system on an anti-static surface with the display side down. ([Figure 7.1](#))
- 3 Remove the six (6) Phillips screws and one (1) 3/32" hex screw from the rear cover. ([Figure 7.1](#))
- 4 Carefully lift off the rear cover and set it aside.
- 5 Remove the two display cables from the Main PCBA. ([Figure 7.2](#)) Gently lift on the brown tabs to unlock the cables. (The brown tab remains attached to the connector.)
- 6 Remove the wired connector from the lower section of the Main PCBA. ([Figure 7.3](#))
- 7 Remove the five (5) 3/32" hex screws from the Main PCBA and also the two (2) 3/32" hex screws from the transducer cable strain relief. ([Figure 7.4](#))
- 8 Hold the Main PCBA in place on the system and turn the complete assembly over so that the Main PCBA is resting on the anti-static surface. Gently rotate the display up and away to expose the last display cable. ([Figure 7.5](#)) Gently pull up on the locking mechanism on the connector to release the cable. (The locking mechanism remains in place on the connector.)
- 9 The transducer cable strain relief and plastic insert will drop off of the system. ([Figure 7.5](#)) Retain these parts, they will be used to reassemble the system. Do not remove the battery cable from the Main PCBA.

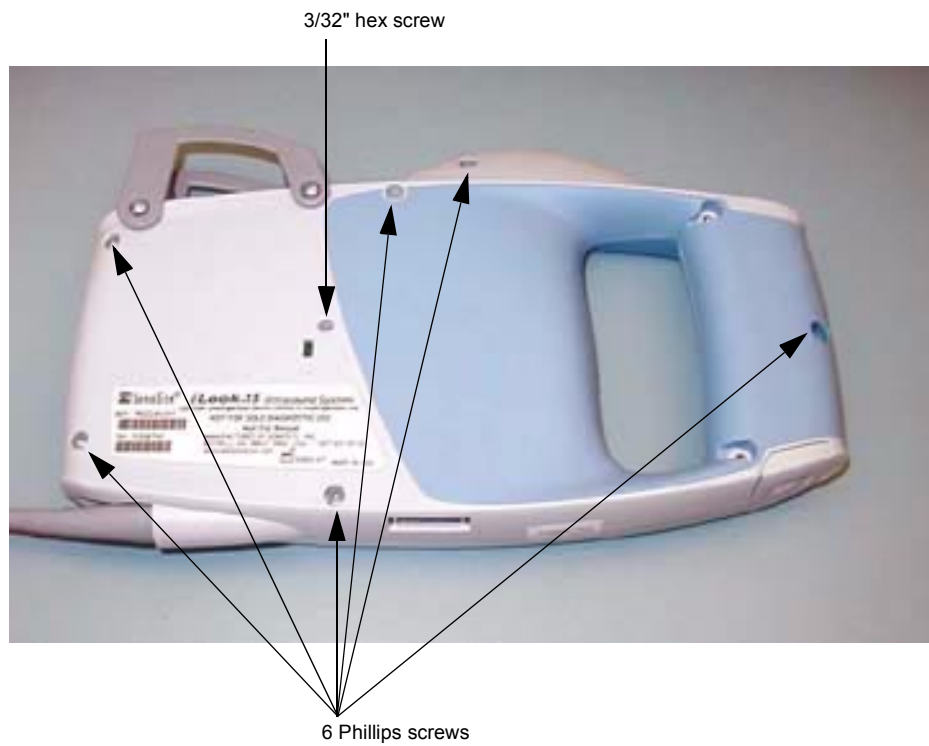


Figure 7.1 Display Side Down

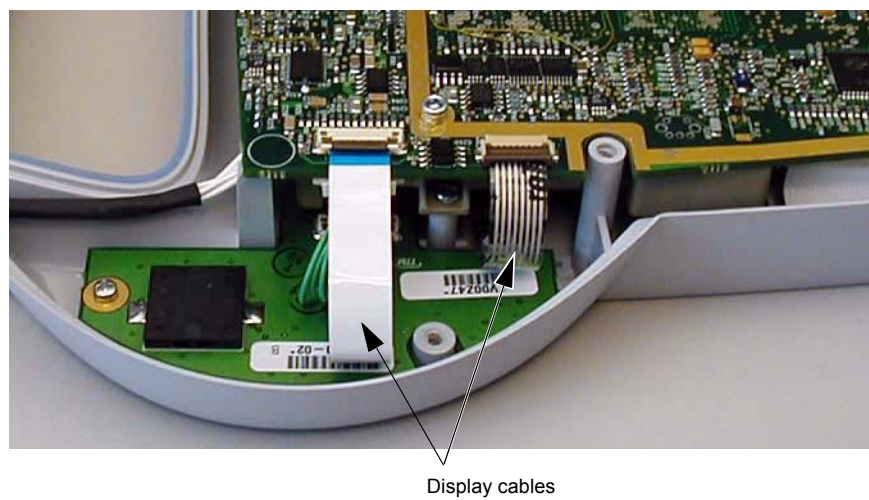


Figure 7.2 Display Cables



Figure 7.3 Wired Connector

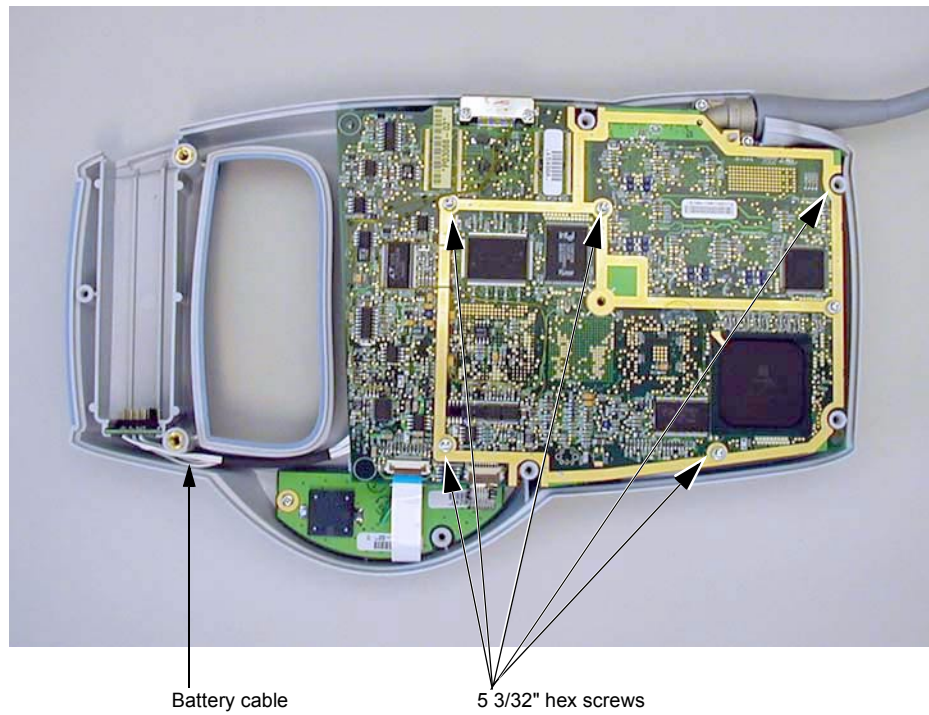


Figure 7.4 Hex Screws and Battery Cable

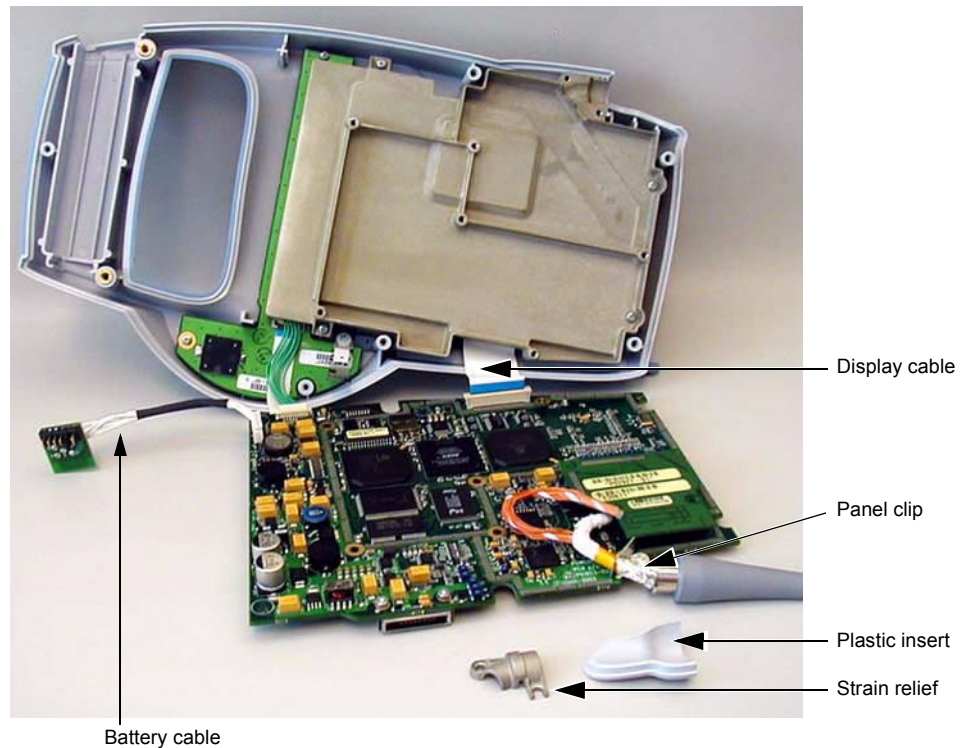


Figure 7.5 Display Cable Exposed

7.1.4 Replacing the Display Subassembly

- 1** Place the Main PCBA on the anti-static surface with the transducer connector towards you and facing up. (Figure 7.5)
- 2** Attach the display cable to the connector making sure it is seated firmly into the connector before pressing the locking mechanism into place. Rotate the display assembly over on top of the Main PCBA. (Figure 7.5)
- 3** Holding the Main PCBA in place rotate the complete assembly over onto the display so the Main PCBA is facing up. (Figure 7.4)
- 4** Gently press the Main PCBA into place. Do not install the screws and force the PCBA into place since this can cause permanent damage to the PCBA. Adjust the PCBA so that it falls into place.
- 5** Install the five (5) 3/32" hex screws that hold the PCBA in place. Torque the screws to 3.4 in/lb. (Figure 7.4)

- 6** Install the plastic insert and the transducer cable strain relief. (Figure 7.6)

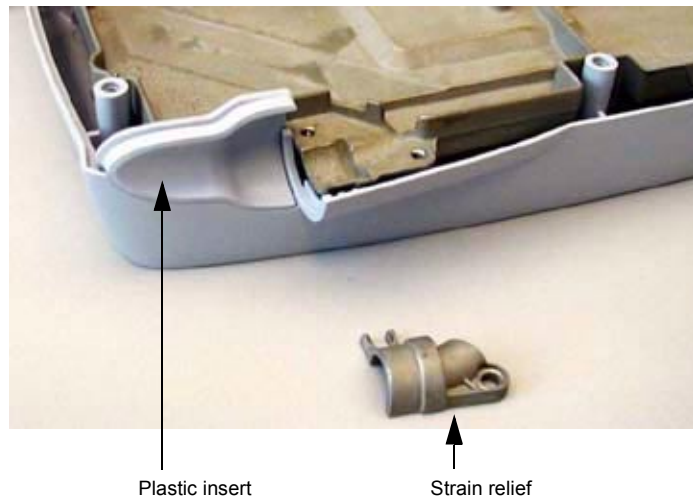


Figure 7.6 Plastic Insert and Transducer Cable Strain Relief

- 7** Insert the two (2) 3/32" hex screws into the strain relief and tighten to 3.4 in/lb. (Figure 7.4)
- 8** Install the wired connector into place on the Main PCBA. (Figure 7.3)
- 9** Install the two display cables into place on the Main PCBA. Make certain they are inserted completely into the connectors. Press on the brown tabs to lock the cables into place. (Figure 7.2)
- 10** Reinstall the battery cable into place. (Figure 7.4)
- 11** Place the rear cover into place. Install the six (6) Phillips screws and the one (1) 3/32" hex screw. Tighten the Phillips screws to 8.0 in/lb. and the 3/32" hex screw to 3.4 in/lb. (Figure 7.1)
- 12** Place the battery in the battery compartment.
- 13** Turn on the system.
- 14** Perform the Display tests in [Chapter 8, Performance Tests, on page 63](#), to verify that the Display Subassembly is functioning properly.

7.2 Transducer Subassembly Replacement

7.2.1 Required Parts

- Service Assembly, C15 Transducer, *iLook* (P03040), or
- Service Assembly, L25 Transducer, *iLook* (P03157)

Caution: Transducers are not interchangeable. Make certain you have the correct transducer or your system will not function.

7.2.2 Required Tools

- A #1 Phillips screwdriver, 7.0 in. (17.8 cm / 177.8 mm)
- A 3/32" hex driver
- A torque driver, 2.0–10.0 in./lb. (0.2–1.1 newton meter)
- An anti-static mat
- A wrist grounding strap

Caution: Always use correct ESD procedures. ESD damage is cumulative and may not be noticeable at first. Initial ESD symptoms may be slightly degraded performance or image quality.

7.2.3 Removing the Transducer Subassembly

- 1 Remove the battery by following the procedure in [Section 4.2, *Installing and Removing the Battery*, on page 20.](#)
- 2 Place the system on an anti-static surface with the display side down. ([Figure 7.1](#))
- 3 Remove the six (6) Phillips screws and one (1) 3/32" hex screw from the rear cover. ([Figure 7.1](#))
- 4 Carefully lift off the rear cover and set it aside.
- 5 Remove the two display cables from the Main PCBA. ([Figure 7.2](#)) Gently lift on the brown tabs to unlock the cables. (The brown tab remains attached to the connector.)
- 6 Remove the wired connector from the lower section of the Main PCBA. ([Figure 7.3](#))
- 7 Remove the five (5) 3/32" hex screws from the Main PCBA and also the two (2) 3/32" hex screws from the transducer cable strain relief. ([Figure 7.4](#))
- 8 Hold the Main PCBA in place on the system and turn the complete assembly over so that the Main PCBA is resting on the anti-static surface. Gently rotate the display up and away to expose the last display cable. ([Figure 7.5](#)) Gently pull up on the locking mechanism on the connector to release the cable. (The locking mechanism remains in place on the connector.)

- 9 The transducer cable strain relief and plastic insert will drop off of the system. (Figure 7.5) Retain these parts, they will be used to reassemble the system. Do not remove the battery cable from the Main PCBA.
- 10 Separate the transducer from the Main PCBA by removing the plastic panel clip and gently pulling the transducer connector PCB from the Main PCBA. (Figure 7.7)

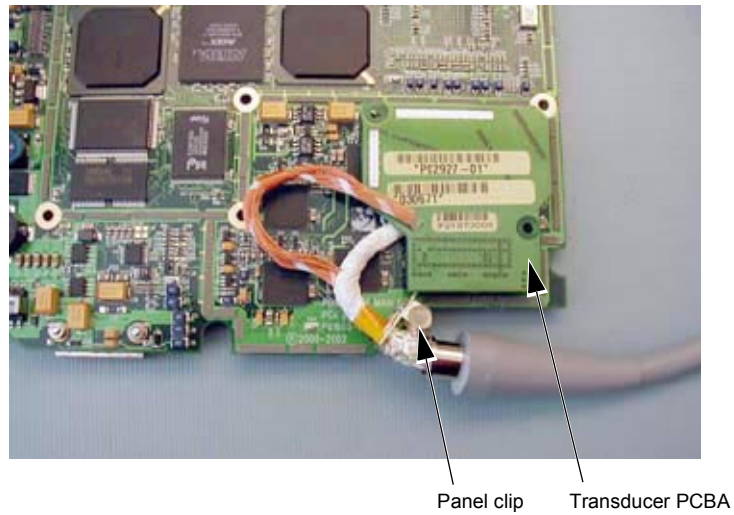


Figure 7.7 Transducer Separated from Main PCBA

7.2.4 Replacing the Transducer Subassembly

- 1 Attach the transducer to the Main PCBA by attaching the transducer connector PCB to the Main PCB Connector. (Figure 7.7)
- 2 Install the plastic panel clip to hold the cable in place. (Figure 7.7)
- 3 Place the Main PCBA on the anti-static surface with the transducer connector towards you and facing up. (Figure 7.5)
- 4 Attach the display cable to the connector making sure it is seated firmly into the connector before pressing the locking mechanism into place. Rotate the display assembly over on top of the Main PCBA. (Figure 7.5)
- 5 Holding the Main PCBA in place rotate the complete assembly over onto the display so the Main PCBA is facing up. (Figure 7.4)
- 6 Gently press the Main PCBA into place. Do not install the screws and force the PCBA into place since this can cause permanent damage to the PCBA. Adjust the PCBA so that it falls into place.
- 7 Install the five (5) 3/32" hex screws that hold the PCBA in place. Torque the screws to 3.4 in/lb. (Figure 7.4)
- 8 Install the plastic insert and the transducer cable strain relief. (Figure 7.6)
- 9 Insert the two (2) 3/32" hex screws into the strain relief and tighten to 3.4 in/lb. (Figure 7.4)
- 10 Install the wired connector into place on the Main PCBA. (Figure 7.3)
- 11 Install the two display cables into place on the Main PCBA. Make certain they are inserted completely into the connectors. Press on the brown tabs to lock the cables into place. (Figure 7.2)
- 12 Reinstall the battery cable into place. (Figure 7.4)
- 13 Place the rear cover into place. Install the six (6) Phillips screws and the one (1) 3/32" hex screw. Tighten the Phillips screws to 8.0 in/lb. and the 3/32" hex screw to 3.4 in/lb. (Figure 7.1)
- 14 Place the battery in the battery compartment.
- 15 Turn on the system.
- 16 Perform the Transducer tests in [Chapter 8, Performance Tests, on page 63](#), to verify that the Transducer Subassembly is functioning properly.

7.3 Rear Case with Label Subassembly Replacement

7.3.1 Required Parts

Service Assembly, Rear case with label, *iLook* (P03041)

7.3.2 Required Tools

- A #1 Phillips screwdriver, 7.0 in. (17.8 cm / 177.8 mm)
- A 3/32" hex driver
- A torque driver, 2.0–10.0 in./lb. (0.2–1.1 newton meter)
- An anti-static mat
- A wrist grounding strap

Caution: Always use correct ESD procedures. ESD damage is cumulative and may not be noticeable at first. Initial ESD symptoms may be slightly degraded performance or image quality.

7.3.3 Removing the Rear Case

- 1 Remove the battery by following the procedure in section [Section 4.2, *Installing and Removing the Battery*, on page 20](#).
- 2 Place the system on an anti-static surface with the display side down.
- 3 Remove the six (6) Phillips screws and one (1) 3/32" hex screw from the rear cover. ([Figure 7.1](#))
- 4 Carefully lift off the rear cover and set it aside.

7.3.4 Replacing the Rear Case

- 1 Place the rear cover into place. Install the six (6) Phillips screws and the one (1) 3/32" hex screw. Tighten the Phillips screws to 8.0 in/lb. and the 3/32" hex screw to 3.4 in/lb. ([Figure 7.1](#))
- 2 Place the battery in the battery compartment.
- 3 Turn on the system.
- 4 Perform the Display tests in [Chapter 8, *Performance Tests*, on page 63](#), to verify that the Display Subassembly is functioning properly.

7.4 Main PCBA Subassembly Replacement

7.4.1 Required Parts

- Service Assembly, Main PCBA, *iLook15* (P03039), or
- Service Assembly, Main PCBA, *iLook25*, (P03156)

Caution: *Main PCBAs are not interchangeable. Make certain you have the correct subassembly for your system or it will not operate.*

7.4.2 Required Tools

- A #1 Phillips screwdriver, 7.0 in. (17.8 cm / 177.8 mm)
- A 3/32" hex driver
- A torque driver, 2.0 - 10.0 in/lb. (0.4 newton meter)
- An anti-static mat
- A wrist grounding strap

Caution: Always use correct ESD procedures. ESD damage is cumulative and may not be noticeable at first. Initial ESD symptoms may be slightly degraded performance or image quality.

7.4.3 Removing the Main PCBA Subassembly

- 1 Remove the battery by following the procedure in section [Section 4.2, *Installing and Removing the Battery*, on page 20.](#)
- 2 Place the system on an anti-static surface with the display side down. ([Figure 7.2](#))
- 3 Remove the six (6) Phillips screws and one (1) 3/32" hex screw from the rear cover. ([Figure 7.1](#))
- 4 Carefully lift off the rear cover and set it aside.
- 5 Remove the two display cables from the Main PCBA. ([Figure 7.2](#)) Gently lift on the brown tabs to unlock the cables. (The brown tab remains attached to the connector.)
- 6 Remove the wired connector from the lower section of the Main PCBA. ([Figure 7.3](#))
- 7 Remove the five (5) 3/32" hex screws from the Main PCBA and also the two (2) 3/32" hex screws from the transducer cable strain relief. ([Figure 7.4](#))
- 8 Hold the Main PCBA in place on the system and turn the complete assembly over so that the Main PCBA is resting on the anti-static surface. Gently rotate the display up and away to expose the last display cable. ([Figure 7.5](#)) Gently pull up on the locking mechanism on the connector to release the cable. (The locking mechanism remains in place on the connector.)

- 9 The transducer cable strain relief and plastic insert will drop off of the system. (Figure 7.5) Retain these parts, they will be used to reassemble the system.
- 10 Remove the battery cable from the Main PCBA and set it aside. (Figure 7.8)

Note: This cable assembly will be attached to the replacement Main PCBA.

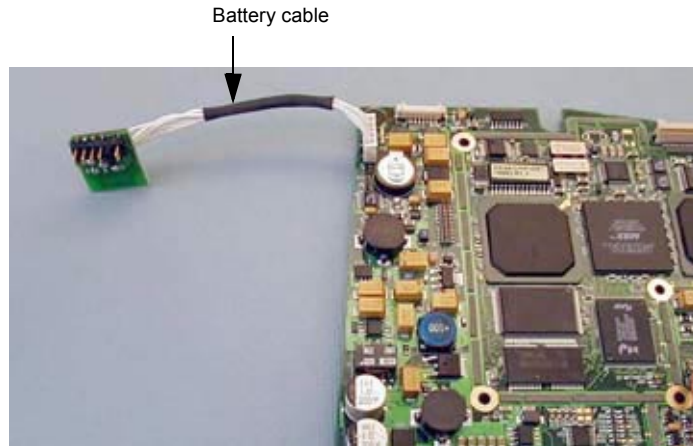


Figure 7.8 Battery Cable from Main P CBA

- 11 Separate the transducer from the Main PCBA by removing the plastic panel clip and gently pulling the transducer connector PCB from the Main PCBA. (Figure 7.7)

7.4.4 Replacing the Main PCBA Subassembly

- 1 Attach the battery cable to the replacement Main PCBA. (Figure 7.8)
- 2 Attach the transducer to the Main PCBA by attaching the transducer connector PCB to the Main PCB Connector. (Figure 7.7)
- 3 Place the Main PCBA on the anti-static surface with the transducer connector towards you and facing up. (Figure 7.5)
- 4 Attach the display cable to the connector making sure it is seated firmly into the connector before pressing the locking mechanism into place. Rotate the display assembly over on top of the Main PCBA. (Figure 7.5)
- 5 Holding the Main PCBA in place rotate the complete assembly over onto the display so the Main PCBA is facing up. (Figure 7.4)
- 6 Gently press the Main PCBA into place. Do not install the screws and force the PCBA into place since this can cause permanent damage to the PCBA. Adjust the PCBA so that it falls into place.
- 7 Install the five (5) 3/32" hex screws that hold the PCBA in place. Torque the screws to 3.4 in/lb. (Figure 7.4)
- 8 Install the plastic insert and the transducer cable strain relief. (Figure 7.6)
- 9 Insert the two (2) 3/32" hex screws into the strain relief and tighten to 3.4 in/lb. (Figure 7.4)

- 10 Install the wired connector into place on the Main PCBA. ([Figure 7.3](#)).
- 11 Install the two display cables into place on the Main PCBA. Make certain they are inserted completely into the connectors. Press on the brown tabs to lock the cables into place. ([Figure 7.2](#)).
- 12 Reinstall the battery cable into place. ([Figure 7.4](#))
- 13 Place the rear cover into place. Install the six (6) Phillips screws and the one (1) 3/32" hex screw. Tighten the Phillips screws to 8.0 in/lb. and the 3/32" hex screw to 3.4 in/lb. ([Figure 7.1](#))
- 14 Place the battery in the battery compartment.
- 15 Turn on the system.
- 16 Perform the Display tests in [Chapter 8, Performance Tests, on page 63](#), to verify that the Display Subassembly is functioning properly.

7.5 *iLook* Docking Station Assembly

During the Warranty period, or under Extended Service Support, customers who experience Docking Station failures will receive an exchange product by overnight shipping. Contact the SonoSite Technical Support Department for immediate service.

Outside of the Warranty period the Docking Station Assembly may be repaired by ordering and replacing any of the parts identified in [Section A.10, Docking Station Assembly, on page 82](#), or by ordering a replacement Docking Station for overnight delivery.



Figure 7.9 *iLook* Docking Station Assembly (P02414)

7.5.1 iLook Docking Station Disassembly and Reassembly

- 1 Turn the Docking Station upside down.
- 2 Remove the seven (7) Phillips head screws identified in [Figure 7.10](#).

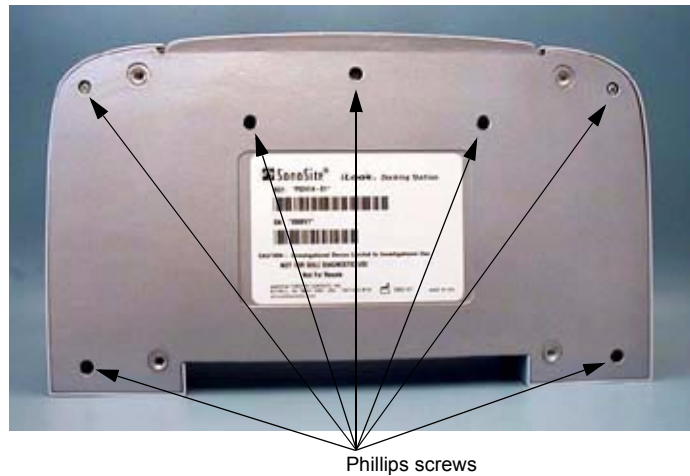


Figure 7.10 Docking Station Screws

- 3 Hold the top cover in place and gently turn the complete assembly over so it sits on the base.
- 4 Lift off the top cover leaving the cradle assembly in place.
- 5 Gently lift the cradle assembly and rotate it away. ([Figure 7.11](#))

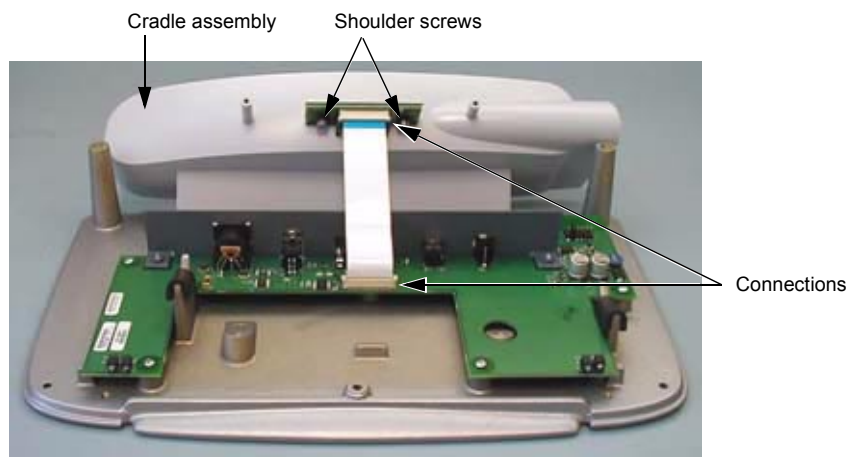


Figure 7.11 Docking Station Cradle Assembly

- 6 Remove the flex cable by releasing the locking mechanism on either of the two connectors. ([Figure 7.11](#))
- 7 The system connector is removed from the cradle assembly by removing the two (2) Phillips head shoulder screws. ([Figure 7.11](#))

- 8 The PCBA is removed from the base assembly by removing the five (5) Phillips head screws and lifting off the board. (Figure 7.12)

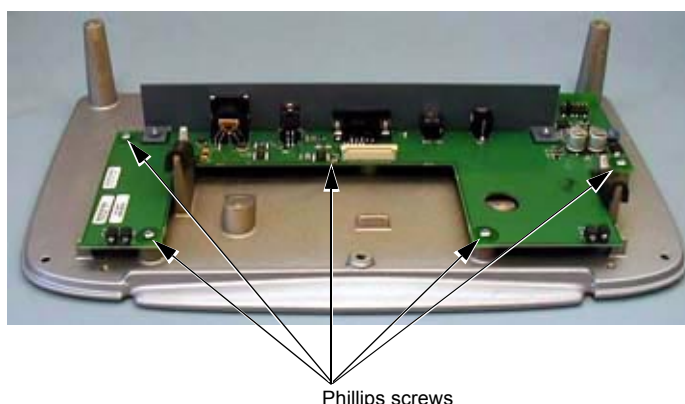


Figure 7.12 Docking Station Head Screws

- 9 Assemble the Docking Station by following steps 1-8 in reverse order.

7.5.2 iLook Docking Station/Stand Theory of Operation

1 Main Battery Status LEDs and I/O Control

The System communicates with the Docking Station and Stand via the I2C Interface. When the System is installed, it pulls the SYS_SENSEN line low, enabling power to the Main Battery Status LEDs (Docking Station only). A Phillips PCF8574, 8-bit Read/Write I2C Expander Chip is used to control the signals listed in Table 7.1. Its address is set to 42h. Each time the System is placed in the Docking Station or Stand, it needs to set each of these bits to the appropriate state; except, in the case of the Stand, Bits 0 – 2 are unused.

Table 7.1 I2C Expander Chip I/O Assignments

Signal	Bit	R/W	Description
MAIN_CHG	0	Write	Controls the Main Battery Charging LED (Yellow). 0 = On. 1 = Off.
MAIN_RDY	1	Write	Controls the Main Battery Ready LED (Green). 0 = On. 1 = Off.
CHG_DISABL	2	Write	Allows the System to disable the Spare Battery Charger. 1 = Disable.
PRNT_STAT	3	Read	Peripheral Device Status Input. 0 = Low. 1 = High.
PRNT_ENBL	4	Write	Printer Control Buffer Tri-state Enable. 0 = Tri-State. 1 = Enabled.
PRNT_CTRL	5	Write	Peripheral Device Control Output. 0 = Low. 1 = High.
VBUS_SENSE	6	Read	Used to sense USB connection. 0 = Not connected. 1 = Connected.
RS232_ENBL	7	Write	Enables RS-232 interface. 0 = Disabled. 1 = Enabled.

2 Docking Station and System Sense

The System uses the Docking Station Sense and System Sense Signals to determine if it is in a Docking Station, Stand or attached to a Power Adapter Cable. As shown in Figure 7.13, in all three cases, Docking Station Sense is pulled low, thus signaling the System that something is attached.

As shown in [Table 7.2](#), if the System is in the Docking Station or a Power Adapter Cable is attached, System Sense will be Low; however, only in the case of the Power Adapter Cable will a pulse transmitted on System Sense be echoed back on Docking Station Sense.

If the System is in the Stand, System Sense will be High.

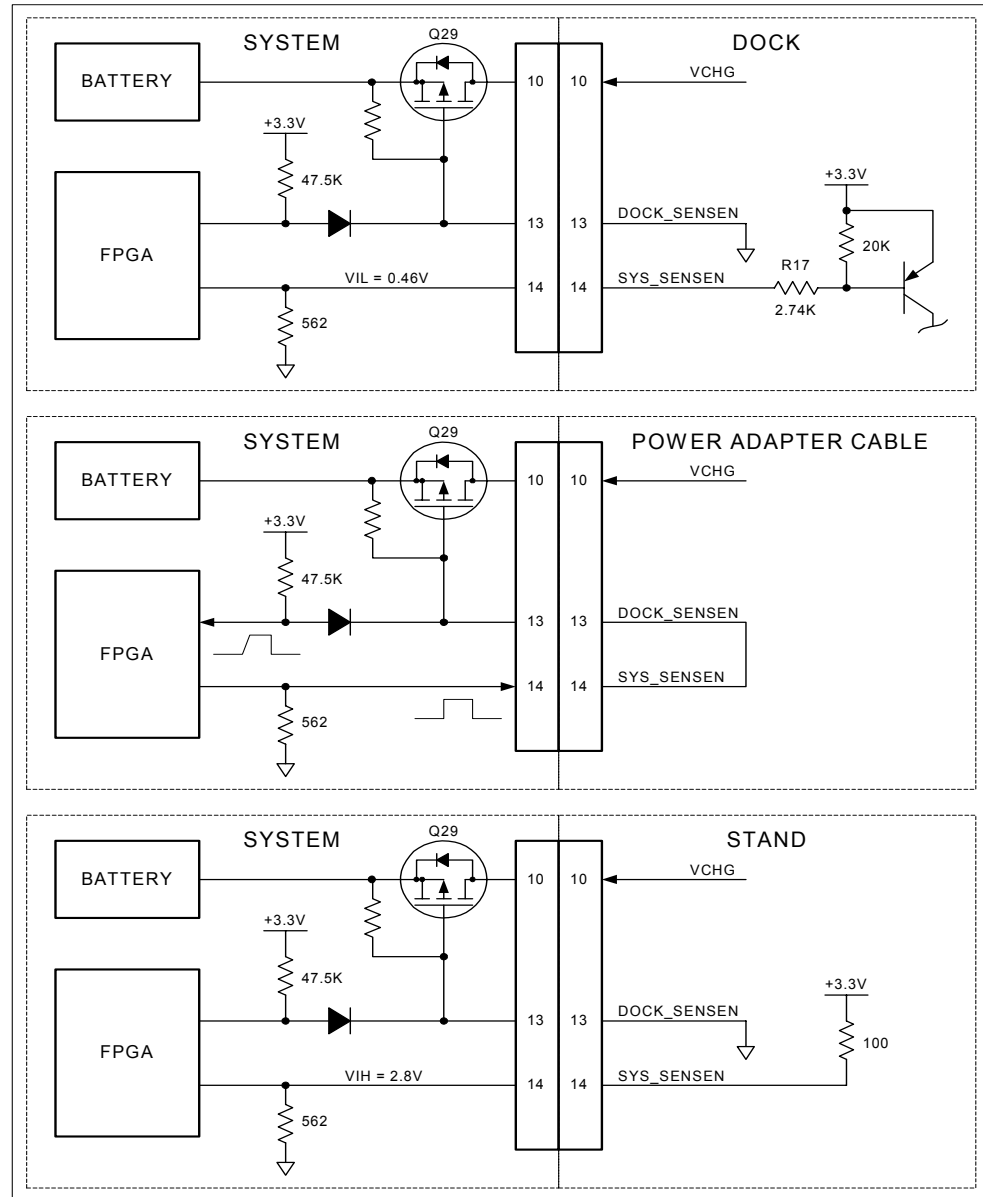


Figure 7.13 Docking Station/Stand/Power Adapter Cable Sense

Table 7.2 Docking Station/Stand/Power Adapter Cable Detection Truth Table

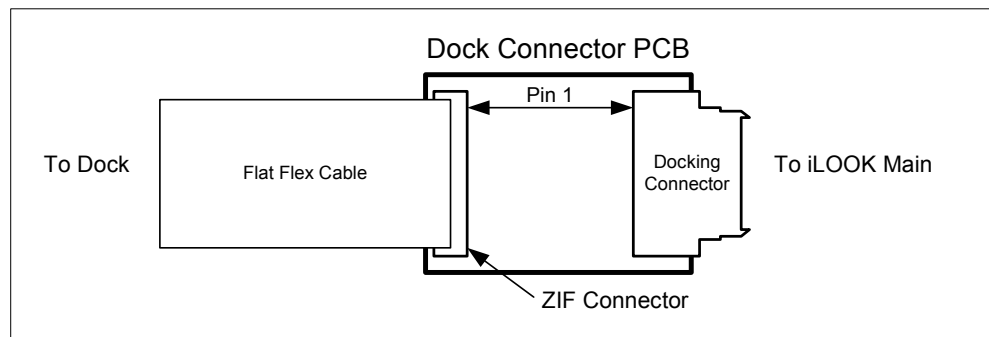
Device	SYS_SENSEN	DOCK_SENSEN
Stand	1	0
Docking Station	0	0
Power Adapter Cable	0	0
Power Adapter Cable	1	1

3 Spare Battery Charger (Docking Station only)

A MAX1758 Lithium-Ion Battery Charge Controller IC controls the Spare Battery Charger. Power is drawn from the +15VDC output from the Power Supply. The total +15VDC current is sensed and limited to less than its rated output by reducing the Spare Battery Charge current if necessary.

4 Docking Station Connector PCB Assembly

The Docking Station Connector PCB is a two-layer board with the connectors and traces on Layer 1 and a ground plane on the bottom. Wide traces are used for the VPWR, VCHG, GND and PWR_RET signals. It connects to the Docking Station and Stand PCB Assemblies via flat flex cable as shown in [Figure 7.14](#). See [Table 7.9](#) for pin assignments.

**Figure 7.14** Docking Station Connector PCB Assembly

5 Docking Station and Stand PCB Assemblies

The Docking Station and Stand PCBs are four layer boards with components on Layer 1, traces on Layers 2 and 3 and ground plane on the bottom. Wide traces or split ground planes are used for the VPWR, VCHG, GND and PWR_RET signals.

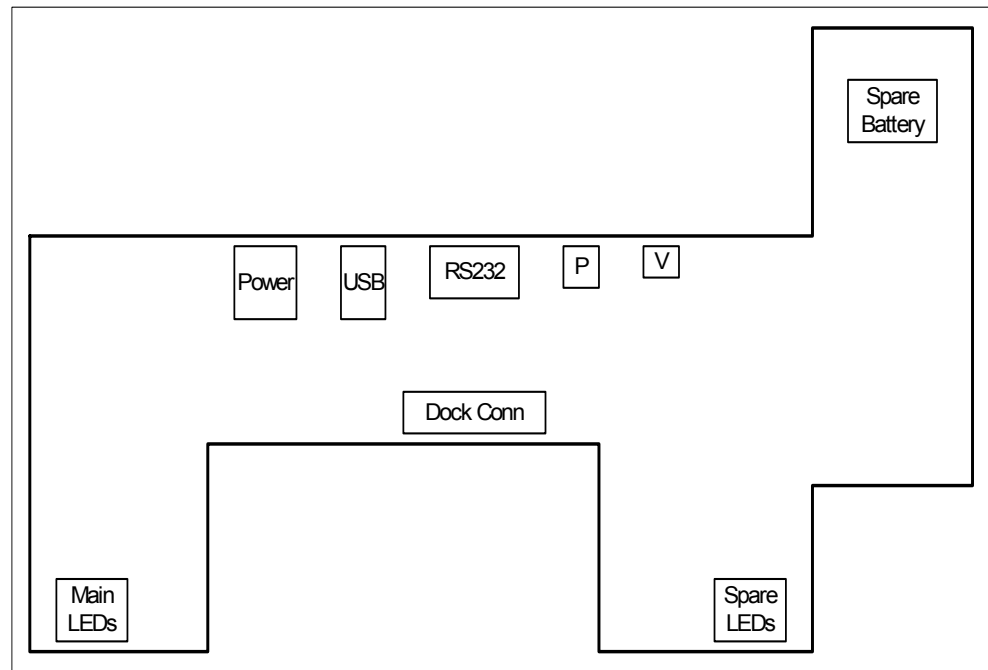


Figure 7.15 Docking Station Board Outline and Connector Placement

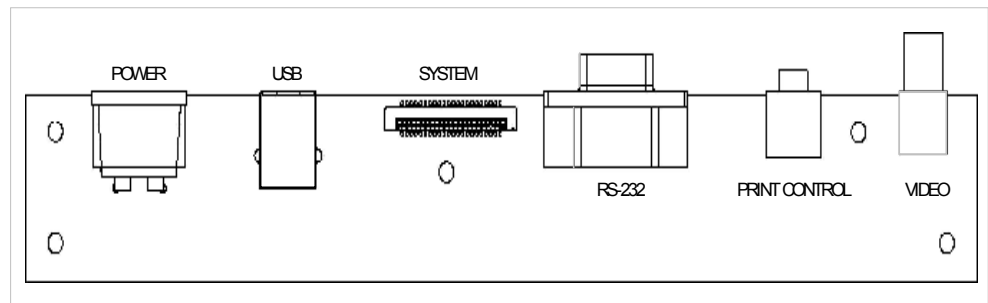


Figure 7.16 Stand Board Outline and Connector Placement

6 Power Adapter Cable

A wiring Diagram for the Power Adapter Cable is shown in [Figure 7.17](#).

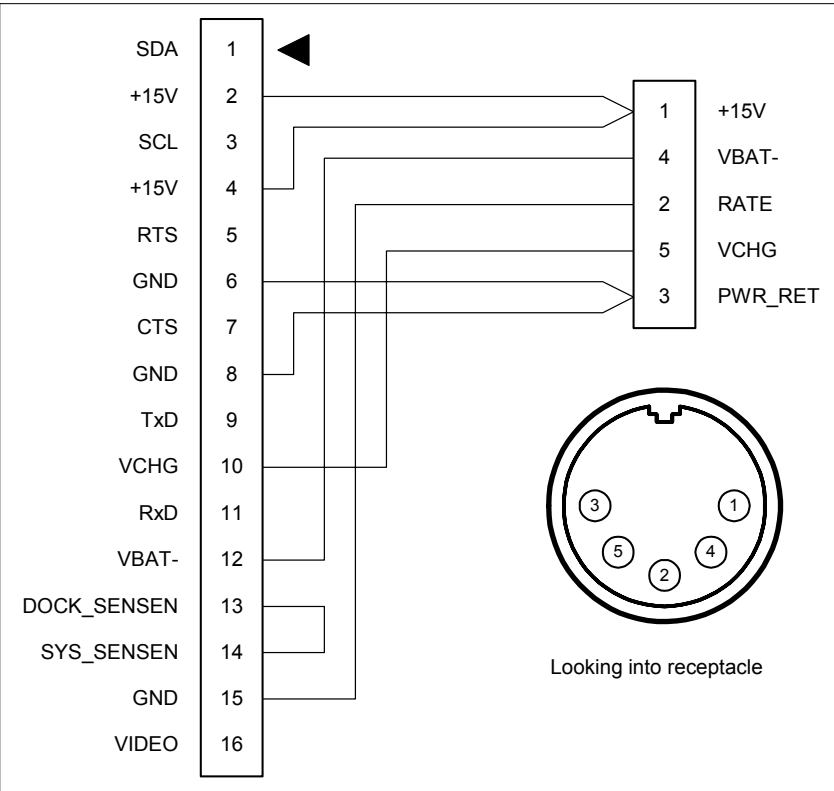


Figure 7.17 Power Adapter Cable Wiring Diagram

7 Connector list

Pin assignments for each of the connectors are given in the following tables:

Table 7.3 Video Connector Pin Assignments

Signal	Pin	Description
VIDEO_RET	1	Signal ground.
VIDEO	2	Composite video output.

Table 7.4 Power Connector Pin Assignments

Signal	Pin	Description
+15VDC	1	Supplies operating current for the Docking Station and System.
CHG_RATE	2	Sets the charge rate. Pulled low to select the required low charge rate.
PWR_RET	3	Power return line for operating and charging current.
VBAT-	4	Sense line connected to the negative battery terminal for both batteries.
VCHG	5	Supplies charging current for the System Battery or Spare Battery.

Table 7.5 USB Connector Pin Assignments

Signal	Pin	Description
VBUS	1	+3.3V
D-	2	Data- . Differential data bus conforming to the USB Standard.
D+	3	Data+. Differential data bus conforming to the USB Standard.
GND	4	Ground

Table 7.6 RS-232 Connector Pin Assignments

Signal(s)	Pin(s)	Description
RxD	2	Data received by <i>iLook</i> from connected device.
TxD	3	Data transmitted from <i>iLook</i> to connected device.
GND	5	Signal ground.
RTS	7	Request to Send from <i>iLook</i> to connected device.
CTS	8	Clear to Send received by <i>iLook</i> from connected device.
DCD, DTR, DSR, RI	1, 4, 6, 9	Modem control signals not used or driven by <i>iLook</i> .

Table 7.7 Printer Control Connector Pin Assignments

Signal	Pin	Description
GND	1	Signal ground.
PRNT_STAT	2	Peripheral Device Status Input. 0 = Low. 1 = High.
PRNT_CTRL	3	Peripheral Device Control Output. 0 = Low. 1 = High.

Table 7.8 Spare Battery Connector Pin Assignments

Signal	Pin	Description
VBAT+	1	Positive Battery Terminal
CTYPE	2	Chemistry Type input. 0 = Lithium-Ion. 1 = Lithium Polymer
TPACK	3	10 KOhm @ 25°C thermistor input.
PACK_SENSE	4	Spare Battery Pack Sense Input. 0 = installed. 1 = not installed.
VBAT-	5	Negative Battery Terminal

Table 7.9 Docking Station Connector Pin Assignments

Signal	Docking Station	To Docking Station	To Main	Description
SDA	P7-2	P2-2	P1-1	IIC Data
VPWR	P7-3, 4	P2-3, 4	P1-2	+15VDC input from AC/DC Adapter

Table 7.9 Docking Station Connector Pin Assignments (Continued)

Signal	Docking Station	To Docking Station	To Main	Description
SCL	P7-5	P2-5	P1-3	IIC Clock
VPWR	P7-6, 7	P2-6, 7	P1-4	+15VDC input from AC/DC Adapter
IO1	P7-8	P2-8	P1-5	Muxed signals. USB (D-), API (LSync), RS-232 (RTS)
GND	P7-9	P2-9	P1-6	Connected to Digital Ground.
IO2	P7-10	P2-10	P1-7	Muxed signals. USB (D+), API (FSync), RS-232 (CTS)
TxD	P7-12	P2-12	P1-9	RS-232 TxData from <i>iLook</i> to connected device.
VCHG	P7-13, 14	P2-13, 14	P1-10	Battery charge input from AC/DC Adapter.
RxD	P7-15	P2-15	P1-11	RS-232 RxData to <i>iLook</i> from connected device.
VBAT-	P7-16	P2-16	P1-12	Connected to Digital Ground at Negative Battery Pack Terminal input.
DockSensen	P7-17	P2-17	P1-13	Used to detect if Unit is in or out of Docking Station. 0 = In. 1 = Out.
SysSensen	P7-18	P2-18	P1-14	Enables power to I2C Expander. 0 = enabled.
VIDEO_RET	P7-19, 21	P2-19, 21	P1-15	Video Return. Isolated from Docking Station Power_Return.
VIDEO	P7-20	P2-20	P1-16	Composite Video from <i>iLook</i> to Docking Station connected device.
PWR_RET	P7-1, 11, 22	P2-1, 11, 22	P1-8, 17, 18	AC/DC Adapter Power Return on Connector Shield and Mounting Pins. Isolated from Docking Station Signal Ground.

8 Schematic Diagram

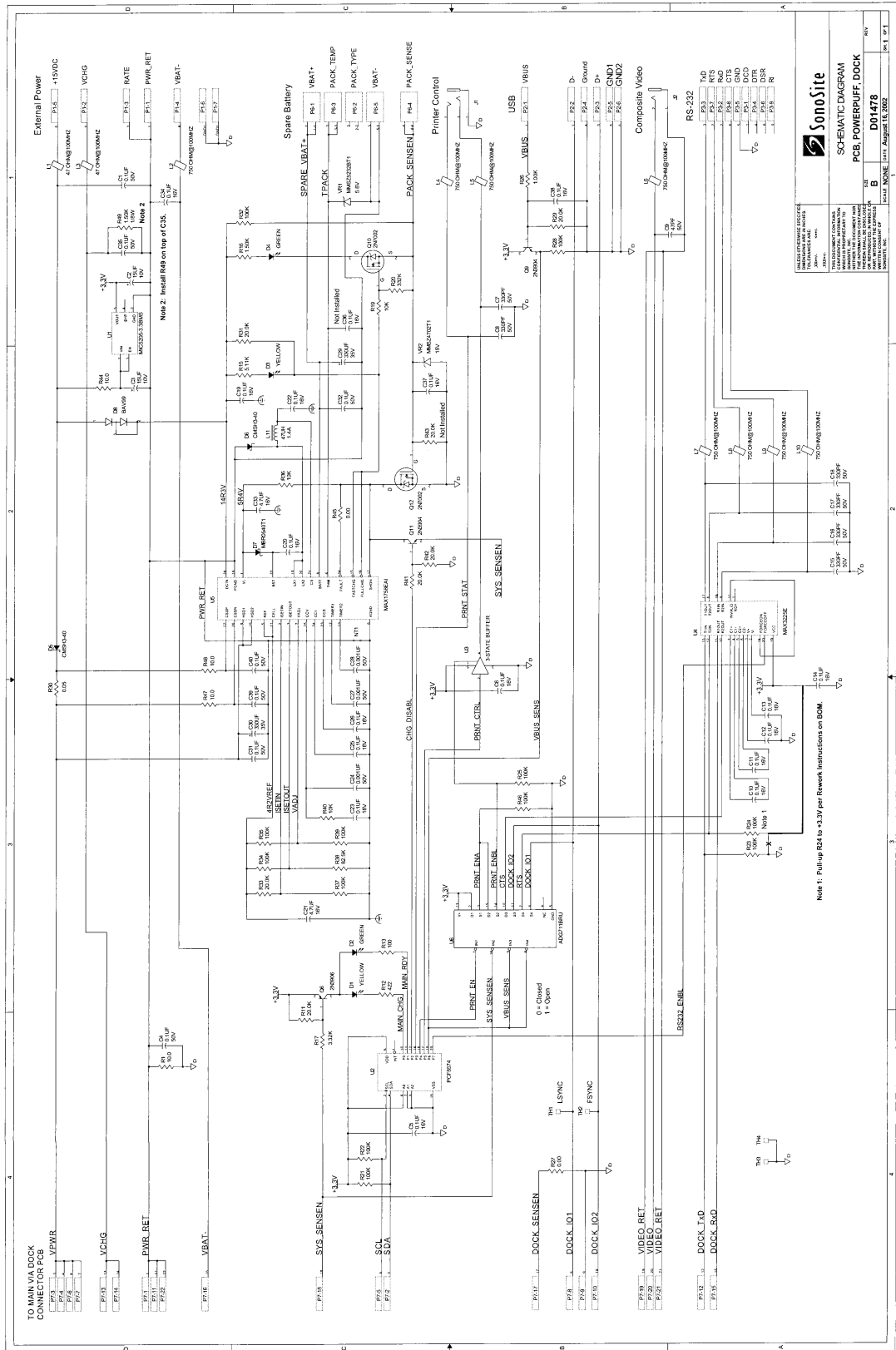


Figure 7.18 Schematic Diagram

7.6 *iLook* Stand Assembly Service

During the Warranty period, or under Extended Service Support, customers who experience Stand failures will receive an exchange product by overnight shipping. Contact the SonoSite Technical Support Department for immediate service.

Outside of the Warranty period the Docking Station Assembly may be repaired by ordering and replacing any of the parts identified in [Section A.10, Docking Station Assembly, on page 82](#) or by ordering a replacement Docking Station for overnight delivery.



Figure 7.19 *iLook* Stand Assembly Service (P02647)

7.6.1 *iLook* Stand Docking Section Disassembly and Reassembly

- 1 Remove the three (3) 1/8" hex screws from the top of the stand. Set the transducer holder aside and place the cradle assembly on a static free surface. (Figure 7.20)

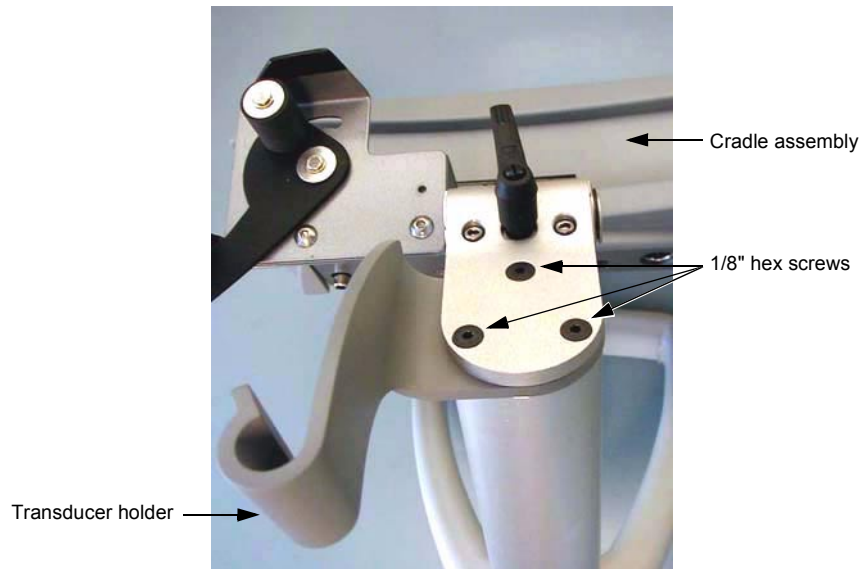


Figure 7.20 Top of Stand

- 2 Remove the four (4) 1/8" hex screws from the bottom of the cradle assembly, (Figure 7.21) and lift off the top cover.

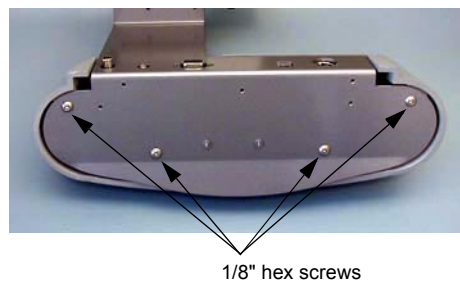


Figure 7.21 Cradle Assembly Bottom

- 3 Remove the PCBA by 1) removing the flex cable by releasing the locking mechanism on each cable connector, (Note: the locking mechanism remains on the connector, do not remove), 2) remove the two Phillips head screws holding the docking station connector assembly to the frame, and 3) remove the five (5) Phillips screws holding the PCB to the frame. (Figure 7.22)

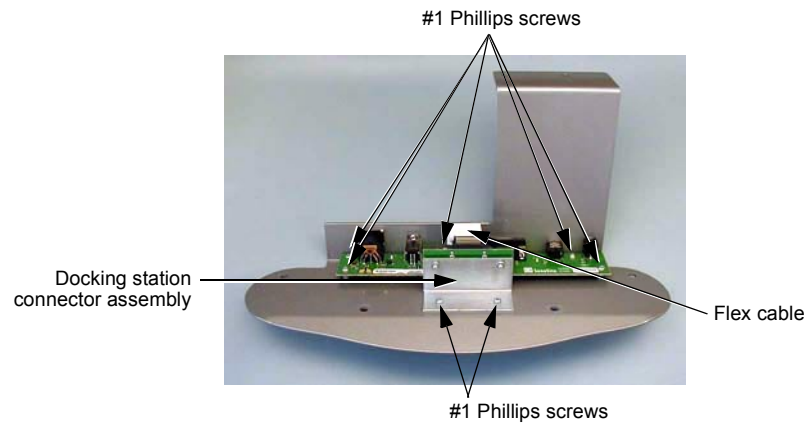


Figure 7.22 PCBA

- 4** Reassemble the docking assembly by following the above steps in the reverse order.

7.6.2 *iLook* Stand Theory of Operation

- 1 The *iLook* Stand Theory of Operation is included in [Chapter 7.5.2, *iLook Docking Station/Stand Theory of Operation*](#).
- 2 Schematic diagram. See [Figure 7.23](#).

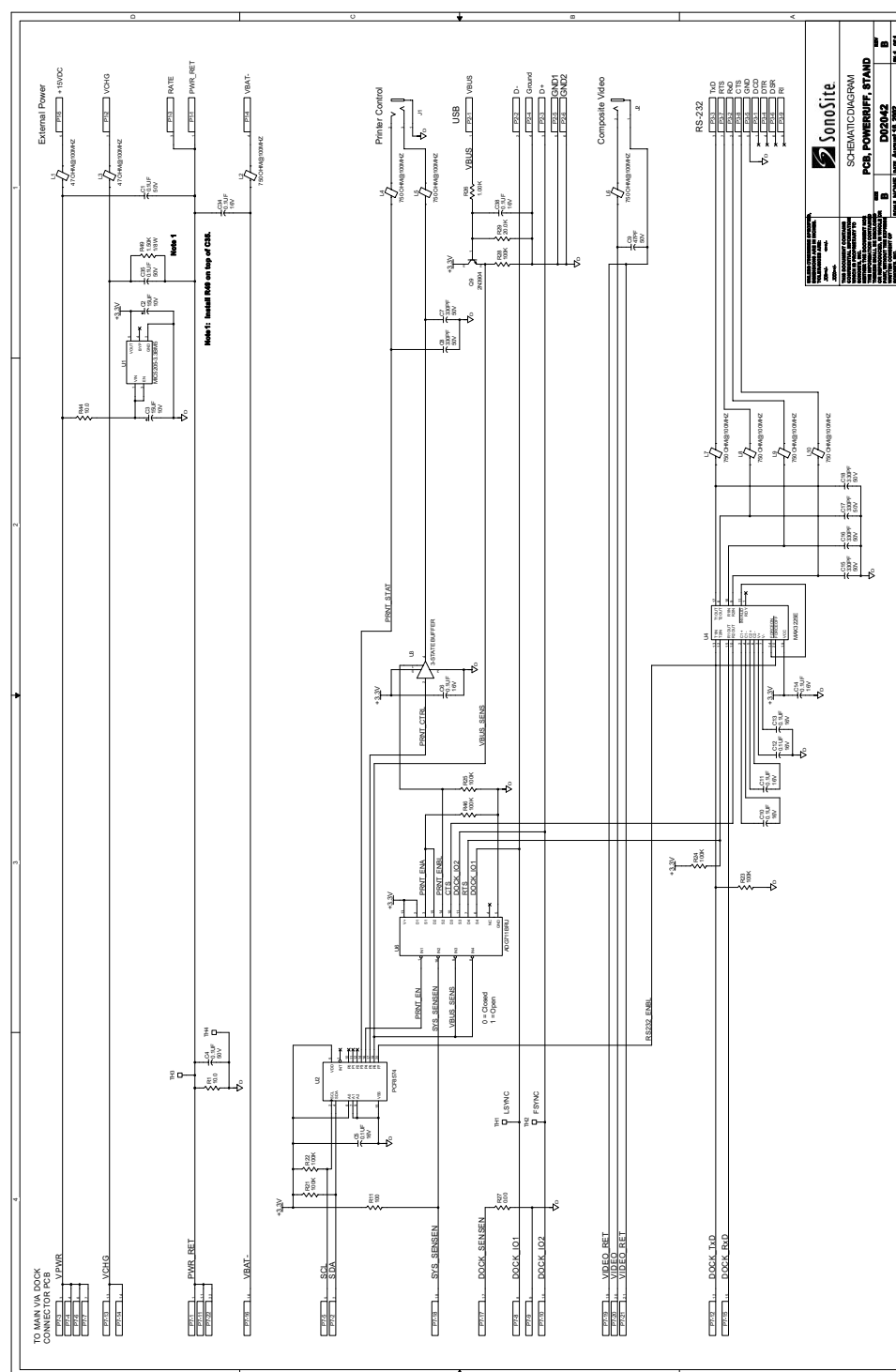


Figure 7.23 Theory of Operation Schematic

CHAPTER 8 Performance Tests

8.1 Overview

Warning: **Critical Test Function** — A failure of the system functions tested in this section could affect safety or effectiveness of the system adversely. While performing the steps in this section, verify that the images on the system display and on the external monitor are acceptable.

Verify that all controls operate smoothly over their full range and that the system responds properly.

To obtain 2D images, SonoSite recommends using the RMI 413A Soft Tissue Phantom or, the RMI 403 GS Multipurpose Phantom. Any equivalent Phantom is acceptable.

To obtain Power Doppler images, SonoSite recommends using the RMI 425 Doppler Phantom or the RMI 1425A Doppler Phantom. Any equivalent Phantom is acceptable.

When making penetration measurements on a phantom, apply the phantom reference value and tolerance to the measurement.

8.2 Test Equipment

- SonoSite *iLook* ultrasound system under test.
- RMI 413A Soft Tissue Phantom, RMI 403 GS Multipurpose Phantom, or the equivalent
- RMI 425 Doppler Phantom, RMI 1425A Doppler Phantom, or the equivalent
- Acoustic gel
- Video Printer
- External Monitor
- *iLook* Quick Reference Guide, P03014

8.3 Setting Up Performance Tests

To set up the performance tests:

- 1 Select **ABD** for exam type.
- 2 Couple the transducer to the phantom, adjusting gain settings and transducer for a proper phantom image (e.g., pins are high-level echoes positioned in straight lines; cysts are sonolucent, edges are sharp, and graphite particles of the phantom are mid-grays).

8.3.1 Scan Reference Orientation

- 1 Verify that the correct transducer name appears in the lower left corner of the system display.
- 2 Verify that the scan plane orientation mark in the image located near the skinline corresponds to element #1 on the transducer. To test, put your finger on the probe and run it across the transducer face. Your finger touching the transducer face should appear at the orientation mark on the display image format.
- 3 With the array pointing down and the orientation mark to the operator's left, element #1 corresponds with the left side of the array.

8.4 Testing 2D Performance

To test 2D performance:

- 1 Adjust the position of the transducer on the phantom.
- 2 Use the 2D system controls to obtain a clear image that shows both the horizontal and vertical rows of pins.

8.4.1 2D Image Quality

To test 2D image quality:

- 1 Verify that the ultrasound image appears uniform in both the axial and lateral direction, with no dropouts or intensity variations.
- 2 Verify that the cystic structure at the focal zone is clearly differentiated from the surrounding tissue and is echo-free, while solid tissue, with numerous echo sources, appears solid.

8.4.2 Axial Measurement Accuracy

Note: Measurements must be performed while the image is frozen.

To test axial accuracy:

- 1** Acquire the image.
- 2** Press **Freeze**.
- 3** Select **Meas** to measure. Two calipers appear on the image display. A menu appears, on which are listed two caliper buttons. (A dotted line connects the two calipers.) The first caliper **Cal 1**, in the menu is active by default.
- 4** Use the **directional controller** to position the caliper. Alternately, use the stylus to select a point on the image. Touching the display with the stylus will move the caliper to that position.
- 5** Press the **directional controller** to fix the first caliper and enable the second caliper. Alternately select **Cal 2** with the stylus.
- 6** Use the **directional controller** to move the caliper. Alternately use the stylus to select a point on the image and touch the display. The results update as you move the caliper and the measurement is complete when you finish moving the calipers.
- 7** Measure the distance, center to center, of two pins that are 5–12 cm apart vertically. ([Figure 8.1](#))

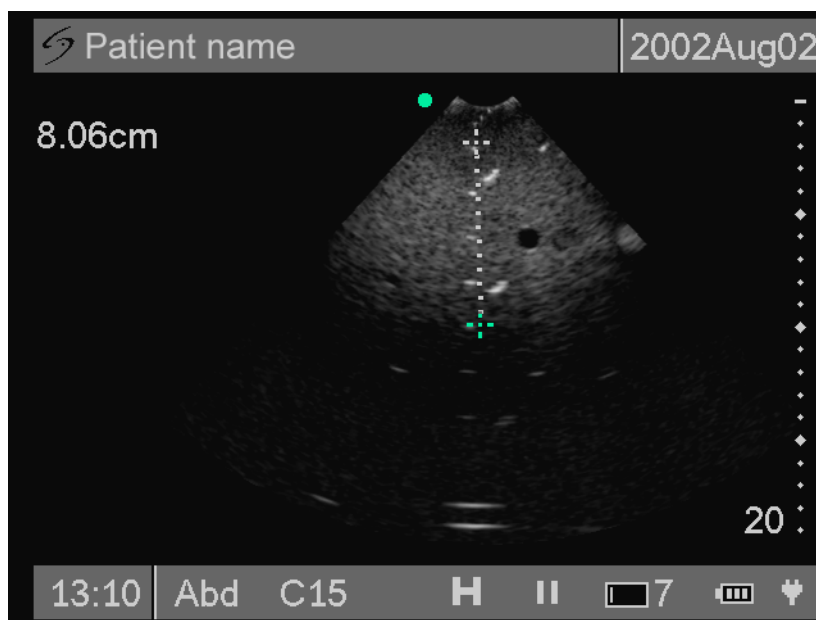


Figure 8.1 Axial Measurement

- 8** Verify that the distance measured is within the tolerance listed in [Table 8.1](#).

8.4.3 Lateral Measurement Accuracy

To test the lateral measurement accuracy:

- 1 Perform steps 1 through 6 in [Section 8.4.2](#).
- 2 Measure the distance, center to center, of two pins that are 4–10 cm apart horizontally. ([Figure 8.2](#))

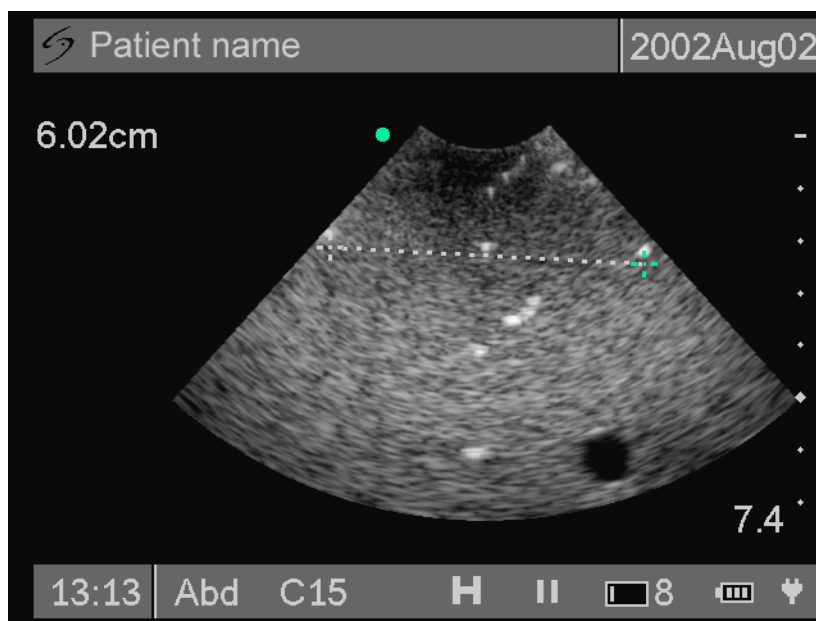


Figure 8.2 Lateral Measurement

- 3 Verify that the distance measured is within the tolerance listed in [Table 8.1](#).
- 4 Press **Freeze** to return the system to live 2D mode.

Table 8.1 System Measurement Accuracy

Measurements	Tolerance
Axial Distance	+/- 2%
Lateral Distance	+/- 2%

8.4.4 Penetration

To test penetration:

- 1 Adjust the system controls to obtain a clear image that shows the limits of echo penetration as shown in [Table 8.2](#).
- 2 Measure from the center of the skinline to the deepest vertical position—where the scatter echoes start to break up and tissue definition is lost.

Table 8.2 Imaging Performance

Imaging Performance	C15	L25
2D Penetration	19.0 cm	6.0 cm

8.5 Additional Performance Tests

8.5.1 CPD

To test CPD:

Note: Use the RMI 425 Doppler Phantom or the RMI 1425A Doppler Phantom.

- 1 Set up the system for CPD mode. Set *iLook 15* exam type to **ABD**.
- 2 Acquire the image.
- 3 Press and release the **menu** key and use the **directional controller** to select **CPD** mode. A Region of Interest (ROI) box is displayed on top of the grayscale image. (Select **off** to return to 2D imaging.)

Note: iLook 15 exam type must be set to ABD.

To move the CPD image:

- Use the **directional controller** to move the CPD ROI. While you are moving the CPD ROI, you will see an outline of the new position moving on the display. When you stop moving, the new position will display the CPD ROI. (The size of the CPD ROI is fixed. There is no control to change it.)

To adjust CPD gain:

- Press the **directional controller** to select **gain**. Use the **directional controller** to increase or decrease the amount of CPD gain.
- 4 Image a vessel using a Doppler phantom. Verify that as the gain controls increase and decrease, Doppler echo intensity increases and decreases to correspond. Verify that no flow exists outside the vessel.
 - 5 Save a CPD image by pressing **Freeze** and then **Save**.

8.5.2 DCPD (*iLook 15* only)

To test DCPD:

Note: Use the RMI 425 Doppler Phantom or the RMI 1425A Doppler Phantom.

- 1 Set up the system for DCPD mode. Set *iLook 15* exam type to **CARD**.
- 2 Acquire the image.
- 3 Press and release the **menu** key and use the **directional controller** to select **DCPD** mode. A Region of Interest (ROI) box is displayed on top of the grayscale image. (Select **off** to return to 2D imaging.)

Note: iLook 15 exam type must be set to CARD

To move the DCPD image:

- Use the **directional controller** to move the DCPD ROI. While you are moving the DCPD ROI, you will see an outline of the new position moving

on the display. When you stop moving, the new position will display the DCPD ROI. (The size of the DCPD ROI is fixed. There is no control to change it.)

To adjust DCPD gain:

- Press the **directional controller** to select **gain**. Use the **directional controller** to increase or decrease the amount of DCPD gain.
- 4 Image a vessel using a Doppler phantom. Verify that as the gain controls increase and decrease, Doppler echo intensity increases and decreases to correspond. Verify that no flow exists outside the vessel.
 - 5 Save a DCPD image by pressing **Freeze** and then **Save**.

8.5.3 Tissue Harmonic Imaging (THI) (*iLook 15* only)

To test Tissue Harmonic Imaging:

- 1 Set up the system for THI mode.
- 2 Acquire the image.
- 3 Press and release the **menu** key and use the **directional controller** to select **H** mode.

To select THI:

- Press the **directional controller**.

Note: When THI is on the black dot next to the menu changes to a black circle and an “H” appears on the bottom of the display.

- 4 Observe a decrease in dot size and a significant loss in penetration due to the higher frequency. Image resolution increases.
- 5 Press the **directional controller** again to turn off THI.

8.5.4 Image Quality Verification Test

To test the image quality:

- Products with replaced subassemblies, or products that have been disassembled otherwise, must undergo an Image Quality Verification Test.
- The Image Quality Verification Test should be performed after successfully completing [Section 8.3, Setting Up Performance Tests, on page 64](#) and [Section 8.5.1, CPD, on page 67](#).
- The test is completed before returning the system to service.
- A certified sonographer must perform the test.

8.5.5 Image Review

Review all saved images and verify that the images are displayed properly.

8.5.6 Printer

To test printer operation:

- 1 Print two images in rapid succession and verify proper operation.
- 2 Verify that the print control button on the printer functions correctly.

8.5.7 Battery Charging

To test battery charging operation:

- 1 Insert a battery into the system. Set the system onto a docking station assembly.
Note: The stand assembly does not have LEDs and the battery charging cannot be tested on the stand.
- 2 Remove the power supply from the system power connector on the docking station assembly.
- 3 Press and hold the **power** switch to turn the system on. Allow the battery to discharge. The battery indicator LEDs (on the lower right of the docking station) change as shown in [Table 4.2 Charge Status LED State Assignments](#) on [page 24](#).
Note: The battery may take 1/2 hour to discharge.
- 4 Reattach the power supply to the docking station power connector.
- 5 Note that the battery indicator LEDs change from yellow to green when the battery is fully charged.
- 6 If the green LED does not illuminate within 3 hours, refer to [Chapter 6, Troubleshooting, on page 29](#) for troubleshooting procedures.

8.5.8 Video Output

Caution: Use only the recommended video monitor, printer, or VCR when verifying the video output at the video receptacle.

To test the video output:

- 1 Attach an external video monitor to the video connector using the video cable.
- 2 Turn on the system power and verify that the video on the external monitor matches the video on the system display.

If the video does not appear similar, or there is no display on the external monitor, refer to [Chapter 6, Troubleshooting, on page 29](#) for troubleshooting procedures.

8.5.9 Touch Screen Calibration

Calibration of the touch screen can be performed at any time.

To enter the calibration mode perform the following steps.

- 1 Power the system on.
- 2 Press the **Patient** button.
- 3 Select or tap **System Set-up**.
- 4 Select or tap **Next Page**.
- 5 Select or tap **System Info**.
- 6 Select or tap **Calibration**. The calibration screen will appear. ([Figure 8.3](#))

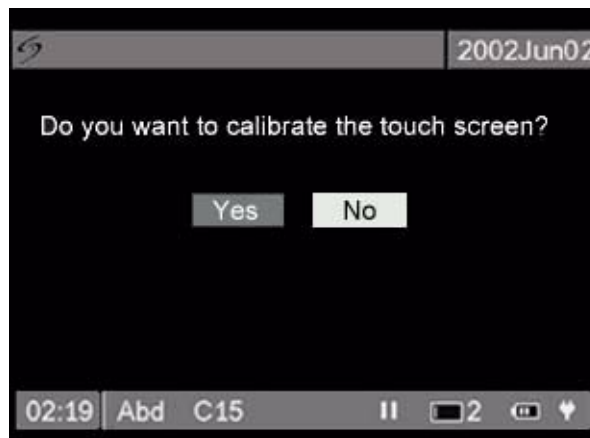


Figure 8.3 Calibration Screen

- 7 Select or tap **Yes**. The first calibration screen will appear. ([Figure 8.4](#))
- 8 Tap the center of the crosshairs. The second calibration screen will appear. ([Figure 8.5](#))
- 9 Tap the center of the crosshairs. The calibration confirmation appears. ([Figure 8.6](#))
- 10 Tap the center of the crosshairs.

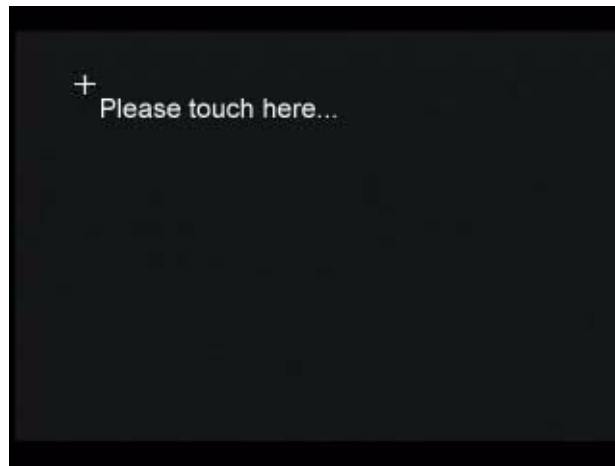


Figure 8.4 First Calibration Screen

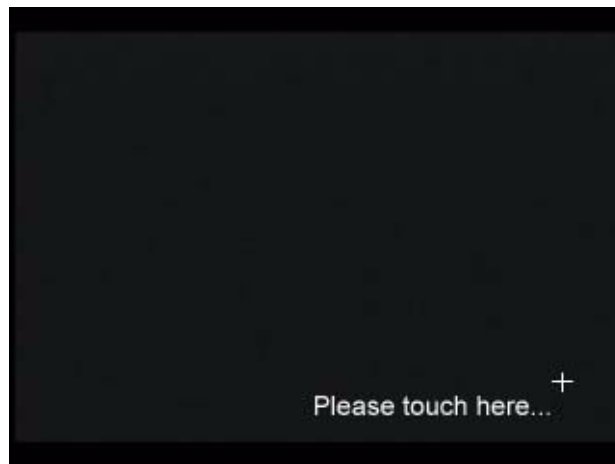


Figure 8.5 Second Calibration Screen

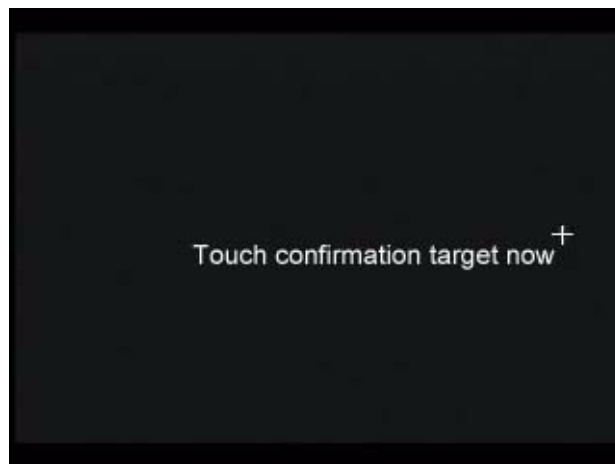


Figure 8.6 Calibration Confirmation Screen

- 11 If the calibration is successful the system will return to the System Info screen.
- 12 If the calibration is not successful you must repeat it. Tap the screen at any location to return to the first calibration step. (Figure 8.4)
- 13 When the calibration is successful select or tap **Done** twice and select or tap **Exit** to return to 2D scanning.

8.6 Returning Products to SonoSite

8.6.1 Contacting SonoSite Technical Support

For technical support of any SonoSite product, do one of the following:

- U.S. and Canadian customers, call **1-877-657-8118**.
- International customers, call **+425-951-1330**.
- Connect to SonoSite on the World Wide Web at www.sonosite.com. Select Products, then choose **Technical Support**.
- E-mail service@sonosite.com

You will be asked to provide the following information by telephone or e-mail:

- Contact name and phone number
- Product name
- Serial number
- Description of the problem

8.6.2 Shipping Instructions

Please contact SonoSite to get a return material authorization number (RMA). Contact SonoSite before returning any product.

The shipping address for all returned products is:

SonoSite, Inc.

Attn: Technical Support RMA _____

21919 30th Drive SE

Bothell, Washington 98021-3904

USA

A Parts List

A.1 Replacement Parts List

The following tables contain all the replaceable parts for the SonoSite ultrasound system. All quantities are one unless otherwise noted.

A.2 Ordering Replacement Parts

To order parts, contact SonoSite Technical Support as indicated in [Section 8.6, Returning Products to SonoSite, on page 72](#).

Note: Replacement of Parts by other than approved SonoSite Repair Facilities voids the warranty.

A.3 Display Subassembly

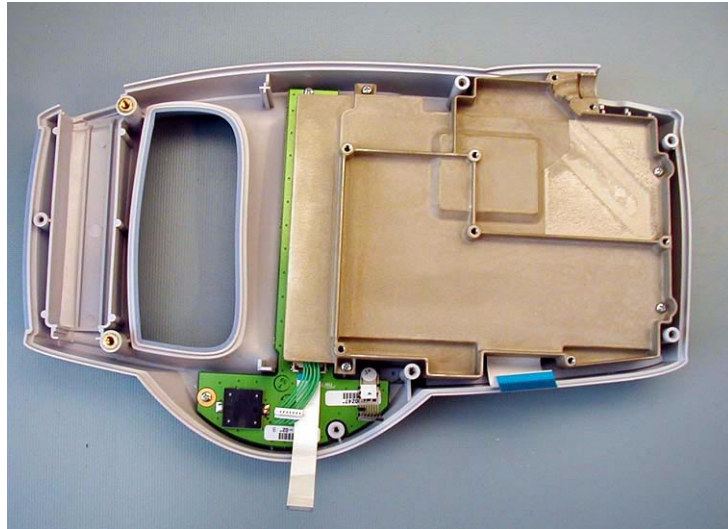


Table A.1 Display Subassembly

Find Number	Part Number	Description
	P03038	Service Assembly, Display, iLook
Display Subassembly Parts List		
<i>Note: This part is sold as a complete assembly. If you choose to attempt repairs to your assembly the warranty is void. Contact technical support to identify the failed component and order it from the list below.</i>		
1	P00348	Assembly, PCB, Backlight Inverter
2	P00533	Screw, socket head cap 4-40
3	P01566	Screw, Phillips
4	P02185	Strain Relief Clamp
5	P02186	Display Frame
6	P02189	Shock Mount
7	P02190	Touchscreen
8	P02217	Knob, D-Control
9	P02218	Cover, Strain Relief
10	P02219	Keypad, Control Panel
11	P02246	Assembly, Enclosure, top
12	P02300	Assembly, PCB, Control Panel
13	P02349	Assembly, PCB, Battery Connector
14	P02362	LCD, 5"

Table A.1 Display Subassembly (Continued)

15	P02435	Label, Display
16	P02436	Cable, FFC, 0.5mm pitch, 18 pos
17	P02437	Wire Harness, Back Light Inverter
18	P02612	Screw, K25 x 6, panhead
19	P02613	Screw, K35 x 10, panhead
20	P02847	Cable, FFC, 1.0mm pitch
21	P02879	Insulator, Probe, PCB
22	P02910	Screw, Panhead, Phillips, 6-32 x .25

A.4 Transducer Subassembly

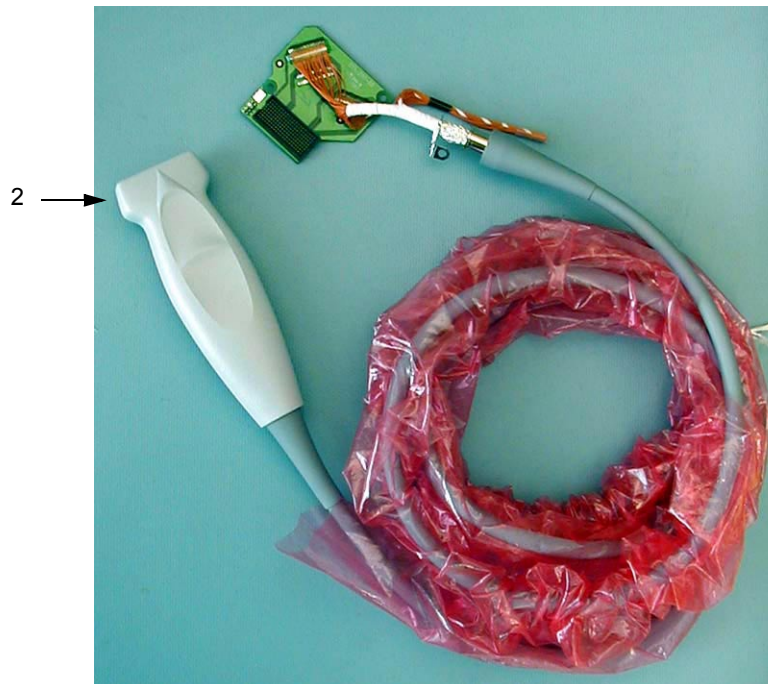
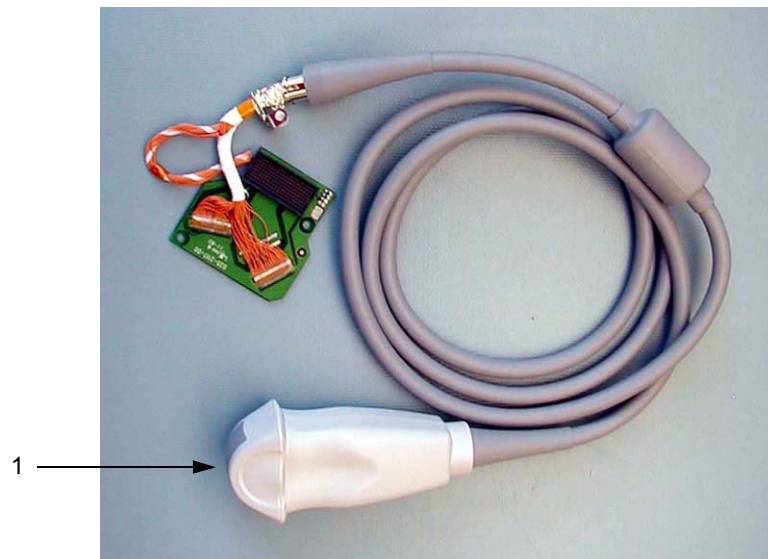


Table A.2 Transducer Subassembly

Find Number	Part Number	Description
1	P03040	Service Assembly, C15 Transducer, iLook
2	P03157	Service Assembly, L25 Transducer, iLook

A.5 Rear Case with Label Subassembly



Table A.3 Rear Case with Label Subassembly

Part Number	Description
P03041	Service Assembly, rear case with label

Note: When ordering this part provide the REF Number and Serial Number from the damaged product. The part will be shipped with a new label.

A.6 Main PCBA Subassembly

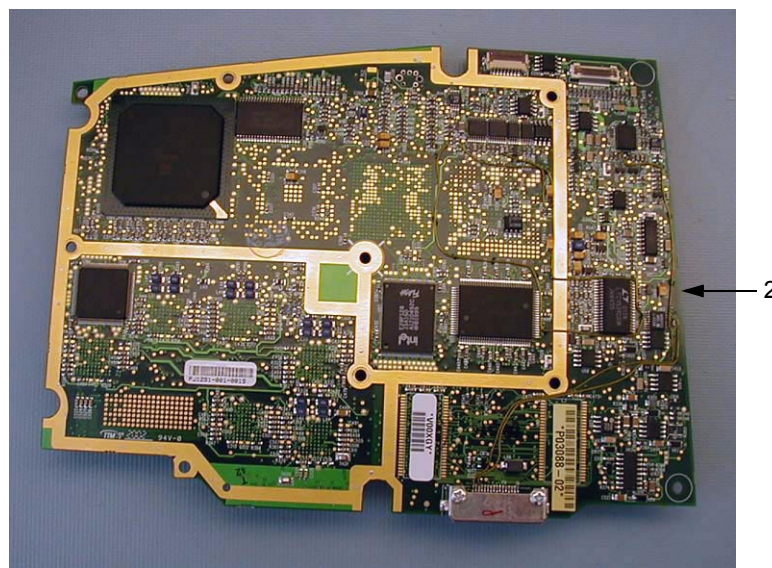
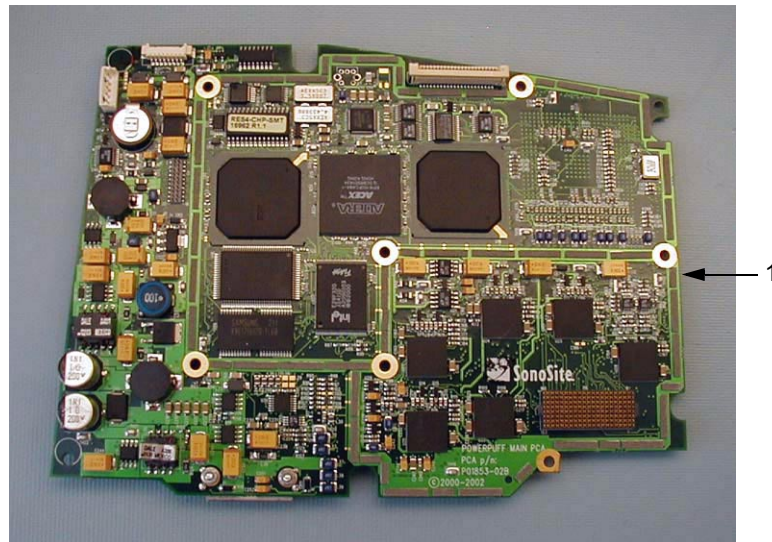


Table A.4 Main PCBA

Find Number	Part Number	Description
1	P03039	Service Assembly, Main PCBA, iLook, C15
2	P03156	Service Assembly, Main PCBA, iLook, L25

Note: These PCBAs are very similar. Be sure to order the correct PCBA for your product.

A.7 Power Supply



Table A.5 Power Supply

Part Number		Description
P01139		Power Supply, iLook

A.8 Cables



Table A.6 Cables

Find Number	Part Number	Description
1	P00537	Control Cable, Printer
2	P01568	Cable, Serial, Null Modem
3	P01111	Video Cable (RCA/RCA)
4	P00536	Video Cable, Printer (RCA/BNC)
5	P02803	Cable, Auxiliary Power

A.9 Additional Spare Parts

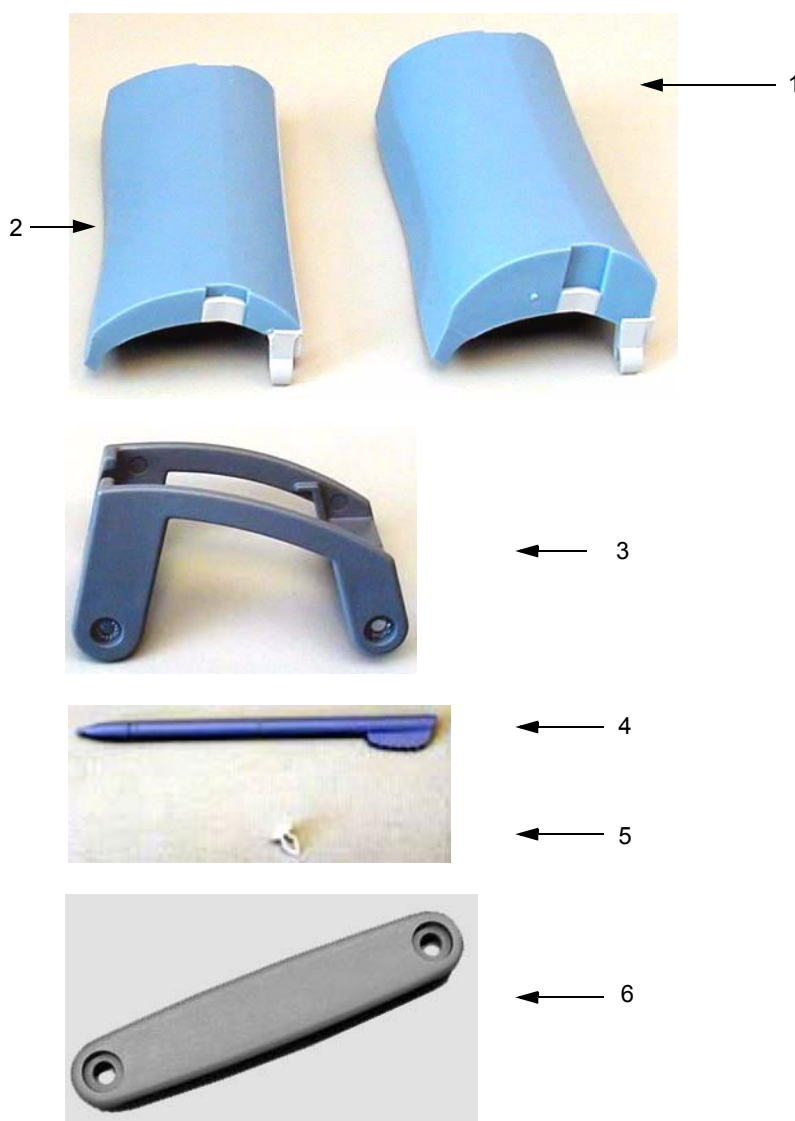


Table A.7 Additional Spare Parts

Find Number	Part Number	Description
1	P02220	Insert, Hand Padding, Thick
2	P02407	Insert, Hand Padding, Thin
3	P02221	Clip, Probe, C15
4	P02183	Stylus
5	P02935	Clip, Panel, Key hole
6	P03069	Brace, Latch, L25

A.10 Docking Station Assembly

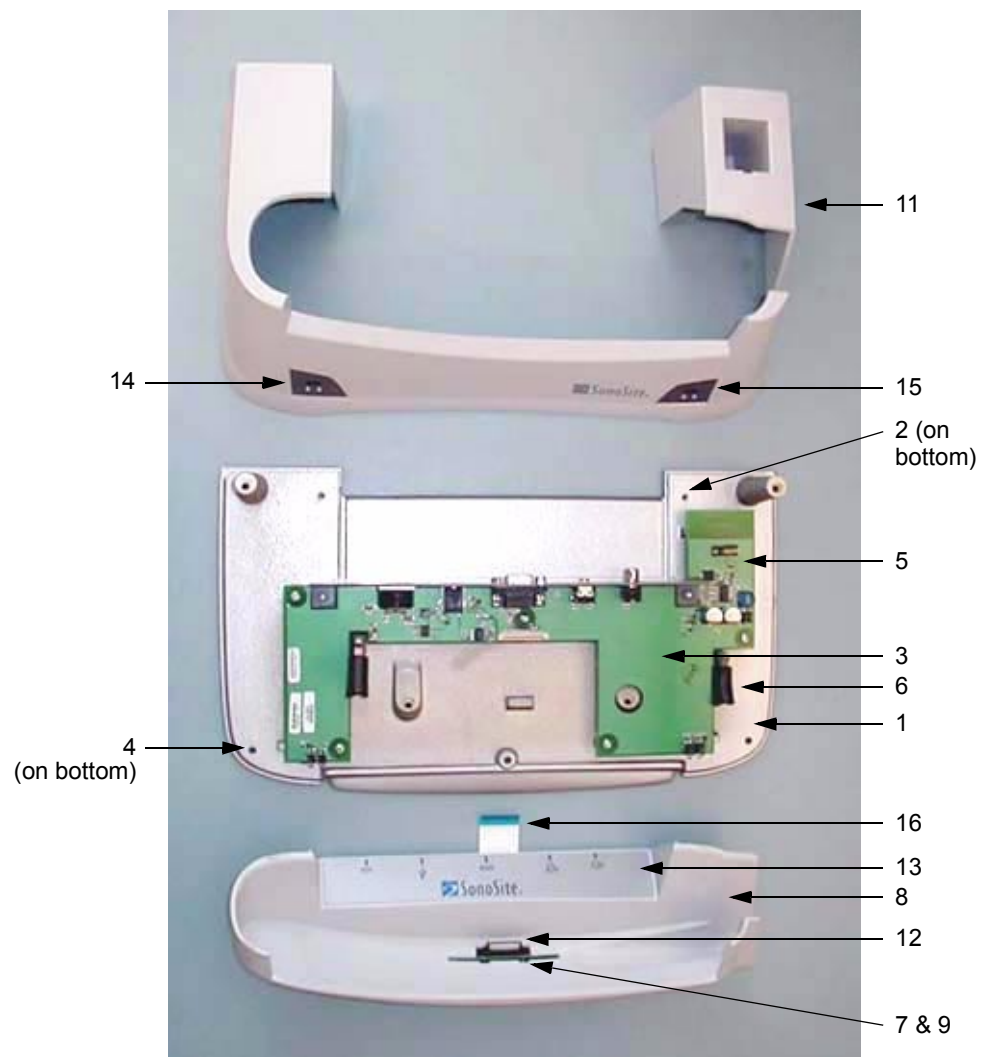


Table A.8 iLook Docking Station Spare Parts

Find Number	Part Number	Description
1	P02396	Enclosure, Bottom, Docking Station
2	P00976	Bumper, Elastomeric
3	P02345	Assembly, PCB, Docking Station
4	P02855	Screw, Panhead, Phillips, 4-40
5	P02397	Panel, Rear, Docking Station
6	P03062	Foam, Spacer, Docking Station Connector

Table A.8 iLook Docking Station Spare Parts (Continued)

7	P02399	Grommet
8	P02445	Cradle, Docking Station
9	P02881	Screw, shoulder, Phillips 4-40
10	P00135	Screw, K35 x 12, panhead, Phillips (not shown)
11	P02395	Enclosure, Top, Docking Station
12	P02347	Assembly, PCB, Docking Station Connector
13	P02958	Label, Connector, Docking Station
14	P02961	Label, LED, Left, Docking Station
15	P02960	Label, LED, Right, Docking Station
16	P02847	Cable, FFC

A.11 iLook Stand

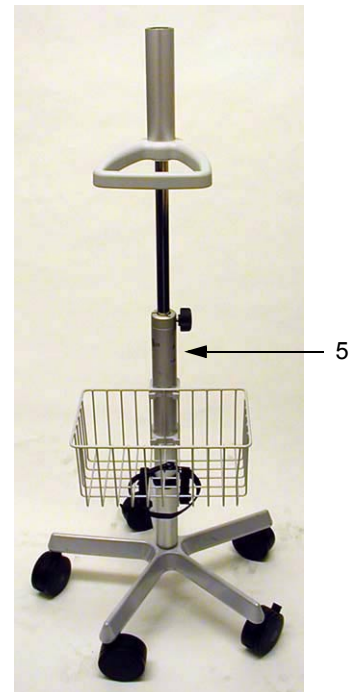
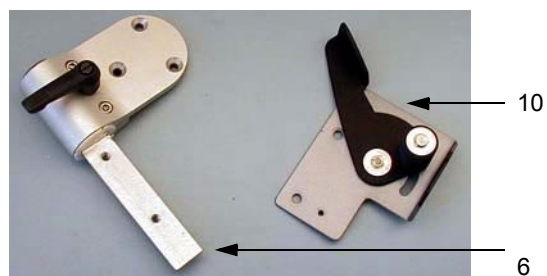
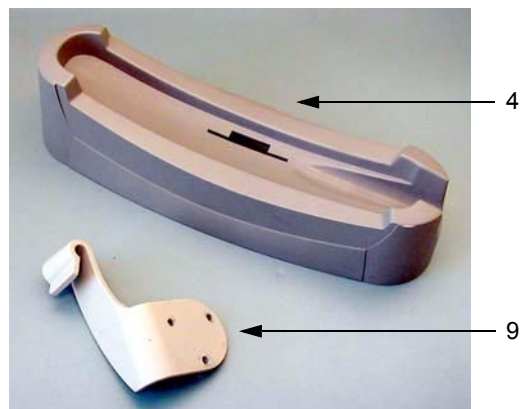
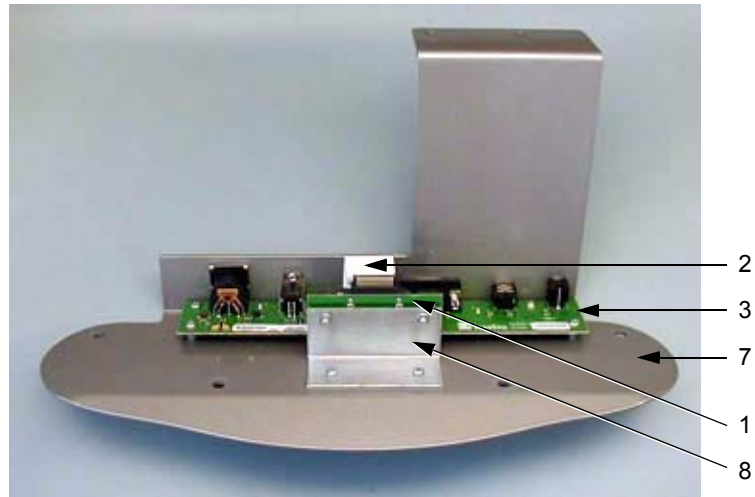


Table A.9 iLook Stand Spare Parts

Find Number	Part Number	Description
1	P02347	Assembly, PCB, Docking Station Connector
2	P02847	Cable, FFC
3	P03029	Assembly, PCB, Stand
4	P03067	Base, Docking Station
5	P03144	Base, Stand
6	P03178	Assembly, Tilt Clamp
7	P03064	Bracket, Pivot, Main
8	P03065	Bracket, Board, Connector
9	P03068	Holder Probe
10	P03151	Assembly, Cam Handle Mounting Bracket
10	P03152	Assembly, Locking Cam Handle
10	P03111	Crescent, Snap ring
10	P03110	Roller, Locking
10	P03079	Sleeve, Roller
10	P03109	Spring, Return
10	P03108	Washer
10	P03158	Washer, Nylon
10	P03177	Washer, Spring

B Service Event Report

The Service Event Report provides information about product failures to the manufacturer and to authorized service facilities, which provide approved warranty services for SonoSite products. For all repairs completed, complete the form and return a copy of it to the following address:

SonoSite, Inc.

Technical Support

21919 30th Drive SE

Bothell, Washington 98021-3904

telephone: 1-877-657-8118 (U.S. customers)

+425-951-1330 (international customers)

facsimile: +425-951-6700

e-mail: service@sonosite.com

website: www.sonosite.com

Select **Products**, then [Technical Support](#).

Service Event Report



Service Provider

Name:	Date:
Company:	
Address:	
Phone Number:	Fax Number:
E-mail address:	

Device Description

Name:	Serial Number:		
Part Number:	Lot Number:	Revision:	
Software Version:	Other Identifiers:		

Event Description

Diagnosis

Service Performed

Performed By:	Date:
Actions:	

Parts Removed

Part Name	Part Number	Serial Number	Lot Number	Rev	Replaced By

Parts Installed

Part Name	Part Number	Serial Number	Lot Number	Rev	Replaced By

Tests Performed (attach test data)

Test:	Test:
Performed By:	Performed By:
Result: Pass ☐ Fail ☐	Result: Pass ☐ Fail ☐

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